PRACTICAL SURGERY ILLUSTRATED

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BY VICTOR PAUCHET

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GENERAL INTRODUCTION

THE reputation of Victor Pauchet as a bold and brilliant surgeon stands high in Paris

"Practical Surgery Illustrated," translated into English by Dr F R B Atkinson, cannot fail to enhance that reputation, and will enable English surgeons to study Pauchet's methods in detail with both pleasure and profit.

'Practical Surgery Illustrated" makes no claim to be a text-book of operative surgery It claims rather to illustrate operations as practised by the author, and these claims are well substantiated. The illustrations are drawn from life, the text explains them. The author presents his methods in a series of living pictures in a manner which should appeal to the practical surgeon.

English surgeons will note with interest that local, spinal, and splanchnic anæsthesia have practically supplanted general anæsthesia in Victor Pauchet's practice.

C GORDON WATSON

INTRODUCTION TO VOLUME VI

THE concluding volume of this work deals in a series of short articles with a variety of subjects

Pauchet acknowledges that a visit to St. Mark's Hospital, London, under the wing of Mr Lockhart Mummery, has enlarged his conception of the problems relating to fistula in ano, and he discusses the methods of dealing with carcinoma of the distal half of the colon with acknowledgments of Mr Mummery's views He is an advocate of temporary cæcostomy when any obstruction exists, followed by resection at a later date, and he favours end to-end anastomosis with an omental graft. The long oblique lumbo-iliac incision is advocated as the method of approach to the left half of the colon. In discussing methods of dealing with a calculus in the pelvic ureter he favours the classical extra peritoneal route with a similar incision to the above

Gastroptosis and bilocular stomach receive further attention in this volume

Pauchet believes that in two-thirds of the patients with gastroptosis the symptoms are due to causes outside the stomach, and he lays stress on curative medical treatment by rest, massage, etc. When operation is required he makes use of the round ligament of the liver to suspend the stomach between the liver on the right and an intercostal space on the left. The round ligament is detached from the umbilicus, sutured to the anterior wall close to the lesser curvature, and then embedded the detached end is threaded through one of the intercostal spaces and fixed there.

For hour glass stomach Pauchet advocates mid gastrectomy rather than gastro-gastrostomy He frequently removes the greater part of the stomach and anastomoses the cardiac end to the duodenum or jejunum

M. Robineau describes the inguinal-femoral operation for radical cure of femoral hernia and provides lucid illustrations

M R de Butler d Ormond provides an original article on neurotomy of the nerves of the stomach for painful gastric conditions in which gross pathological findings are absent, a hypertonic or hyperkinetic state which is labelled **gastric vagotonia**

Neurotomy of the vagal and sympathetic fibres to the stomach has been practised by Latarjet who claims to relieve cases of hyperchlorhydria without visible lesions, a type not usually relieved by gastro-enterostomy The operation is considered to be applicable for the gastric crises of tabes.

The author recognises that considerable investigation is still required to establish beneficial claims for this method of attack in painful gastric conditions, and that the parts played by the vagus and sympathetic are not yet clearly differentiated

A complicated operation for complete uterine prolapse is described by J Abadie (D'Oran)

A preliminary study of the illustrations simplifies the text.

The prolapsed anterior vaginal wall is opened up, and flaps are turned down by a T shaped incision, the anterior margins of the levatores ani are thus exposed. The peritoneum is opened behind the bladder, and the uterus is then rotated on its transverse axis through 180°, the cervix turning backwards and upwards (thus relieving the rectocele), and the fundus forwards and downwards through the peritoneal opening The round ligaments close up to the fundus are then sutured to the margins of the levatores ani.

The edges of the two levatores are sutured to one another, and the vaginal flaps replaced

The volume closes with a brief description of Schauta's method of vaginal hysterectomy Although Pauchet advocates Wertheim's operation in suitable patients, he prefers the vaginal route for the weak, the old and stout, and those otherwise diseased

C GORDON WATSON

March 1925.

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HOW TO MAKE A KNOT WITH THE LEFT HAND



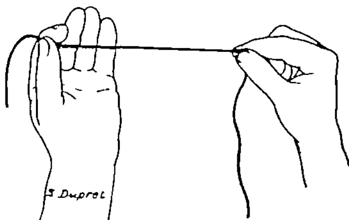


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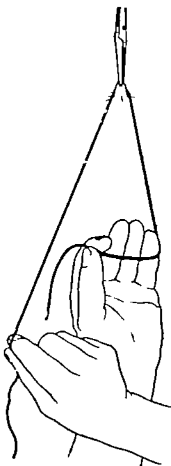


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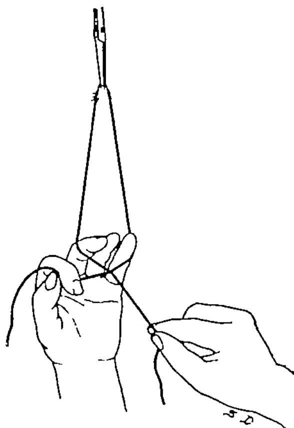


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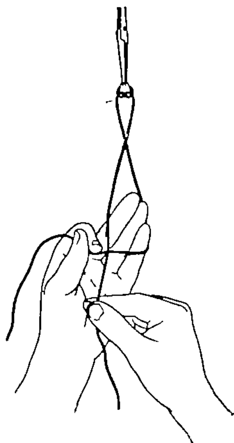


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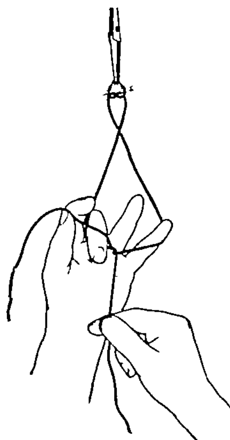


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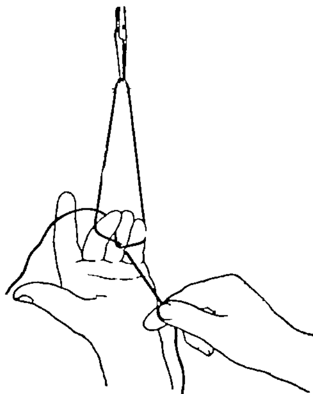
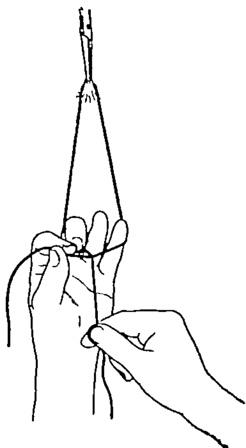
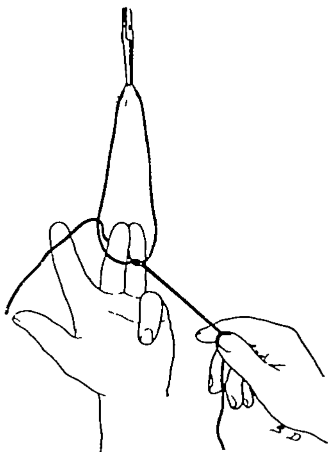
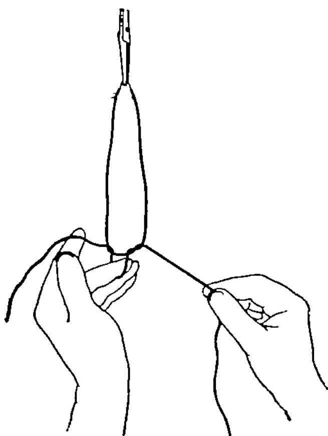
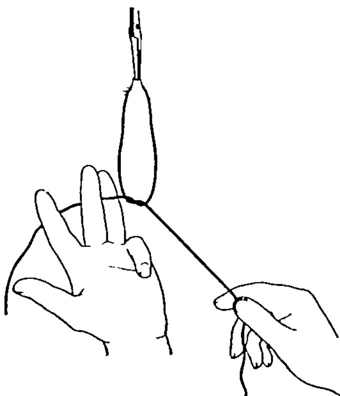


FIG 6.


Fig 7


Fig 8.


Fig 9


Fig 10

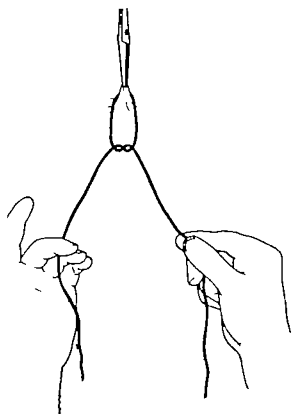


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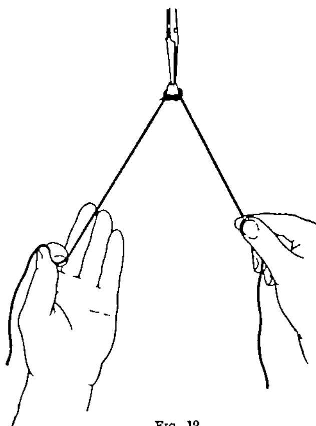


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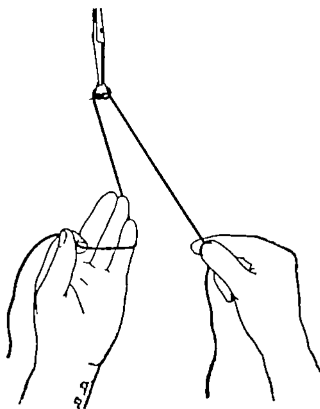


Fig. 13.

PRACTICAL SURGERY ILLUSTRATED

I

GASTROPTOSIS

Treatment

THE term "gastroptosis" is as incorrect as that of "dilatation of the stomach" The name which is applicable to this morbid condition is that of "elongation and laxity of the stomach" The stomach does not drop, since the cardiac end does not change its position, and the pylorus is nearly in its right place, the stomach becomes drawn out, elongated, and atonic its lower border only becomes lowered and reaches the neighbourhood of the pubis.

Gastroptosis is not an Independent Disease.—It is part of a general ptosis of the abdomen and is usually accompanied by dropping of the liver, of the kidney, and of the colon, etc , and it is this which makes its treatment difficult

Why does gastroptosis produce dyspeptic disturbances and symptoms? Because dropping of the pylorus produces a *duodenal kink* which hinders evacuation of the stomach and because the elongation of the stomach *drags on the solar plexus*

Of what Value is Surgical Treatment in Gastroptosis?—Many of our colleagues discountenance it owing to its unreliability They are both right and wrong They are right in that two cases out of three in whom gastropexy has been performed suffer as much as before the operation They are wrong when they refuse to consider the reasons why two thirds of the cases of gastropexy are not improved The failure of gastropexy is as easy to understand as the failure of nephropexy Out of ten patients who complain of gastroptosis three suffer from symptoms due exclusively to the latter, the other two-thirds from different lesions If the kidney be fixed in a patient affected with ureteral calculus or with hydronephrosis from a ureteral kink due to an abnormal polar artery, no alleviation will be obtained If a uterus with a fibrocystic ovary on each side be well fixed hardly any amelioration results

The treatment is wrong it is only natural for the patient to obtain no benefit

Amongst the cases of gastropexy who still suffer, in some the previous functional troubles were not due to the gastroptosis but to unrecognised affections such as biliary calculus, gastric ulcer, Lane's kink, etc , the others are still sufferers, because they have not carried out at the same time any medical treatment

Gastroptosis is, in fact, only one of the manifestations of visceroptosis The cases of gastropexy still have ptosis of the abdominal organs, with insufficient kidneys, ovaries, lungs liver, and endocrine glands, etc If we rest content with fixation of the stomach, even if the indication be marked, the chances are great that the relief afforded will not be sufficient or permanent If, on the contrary massage gymnastics, and medical treatment be employed as well, the results are good

Again if gastroptosis be associated with laxity of the stomach, the mental state of the patients is also devitalised They suffer from psychasthenia, and resolution and powers of concentration are absent They allow an operation and take remedies willingly but they are *aboulic* by nature, and refuse to employ daily gymnastics of one hour s duration, divided into two or three séances but it is indispensable

The surgeon who wishes to perform gastropexy should then put to himself the following questions

(*a*) Does the patient show symptoms which are essentially due to the gastroptosis ? Many such patients do not suffer from this malformation.

(*b*) Are there no concomitant lesions capable of keeping up the symptoms after fixation of the organ ?

(c) Has the patient sufficient energy to subject himself to dietetic treatment and to physical culture to complete the cure ?

If these questions cannot be answered in the affirmative it is better not to operate Personally we have had, like all surgeons, numerous failures and marvellous successes But if all our patients had been willing to obey the above therapeutic indications we should not have had any failures

What are the Symptoms of Gastroptosis ?—A patient suffering from ptosis complains of pains in the stomach which are increased especially on standing and when the stomach is full Raising the stomach by the hand or by a pair of corsets or lying on the back

eases them The method of clinical examination suggested by Leven is the most useful for discovering the signs

The patient with ptosis complains of *constipation,* of an uncomfortable feeling in the upper part of the abdomen, or in the right or left iliac fossa, of flatulence due to *air in the bowel,* of toxic and infectious symptoms resulting from *chronic intestinal stasis,* of low spirits, of headache, of insomnia, of anorexia, of indigestion, of arthralgia of a feeling of cold, and of emaciation, etc These symptoms are not due to gastroptosis, but to chronic intestinal stasis, which usually accompanies it

TREATMENT —Preventive treatment consists in dieting, gymnastics and hygiene carried out from infancy The diet should consist chiefly of fruit, of green vegetables, and of cereals The bowels should be attended to from infancy in order to obtain regular evacuations

Curative Medical Treatment —The condition produces a vicious circle the want of intestinal tonus provokes elongation of the stomach, falling of the colon, and chronic intestinal stasis, which in their turn produce toxæmia anæmia, malnutrition, and a decrease of the general and visceral tonus which exaggerate the muscular atony and the intestinal stasis This vicious circle can be broken if the chronic intestinal stasis be treated The treatment consists in

(*a*) A diet directed against constipation, and this should include food leaving much waste, paraffin oil ox-gall fucus, etc.

(*b*) Massage of the abdomen spondylotherapy (Lebon)

(*c*) Reptation Sir Arbuthnot Lane considers "the *danse du ventre* as only permissible for young constipated girls

(*d*) Rest in bed after meals, or prolonged rest on condition that gymnastics are practised in bed In this way the muscles continue to develop, notwithstanding the horizontal position. The patient should be made to understand that this position is not the same as inaction which causes atrophy, but, on the contrary is a different and efficacious form of activity (gymnastics in bed)

(*e*) Respiratory gymnastics with Pescher's bottle

This treatment should be applied in every case even in those which ought to be or have been submitted to operation (see Vol I , Lane's disease)

Surgical Treatment —The surgeon must remember

(*A*) *The laxity of the stomach is a local manifestation of a general morbid process*

The operation only attacks a local condition and corrects a deformity, and is simply one part of a complete treatment The surgeon must, therefore, know it is only one factor in the whole sequence of remedies which are destined to place a patient suffering from gastroptosis on his feet again

(*B*) The laxity of the stomach *is often complicated with calculus of the gall-bladder, with duodenal or with gastric ulcer, and with chronic intestinal stasis* these different pathological conditions require individual, active, and surgical treatment which ought to be employed before attention is given to the gastroptosis, which may be only an accessory morbid factor At any rate, it is only when treatment has been directed to the one or to the other of these different lesions, and when the result has been found to be insufficient that appeal should be made to gastropexy There should be no thought of combining gastropexy with other complementary operations, because patients with gastroptosis have poor powers of resistance, and do not bear multiple interventions at one and the same time

(*C*) Patients with gastroptosis *do not fill their lungs sufficiently*, their thorax is narrow, they breathe badly or inadequately, and their blood is badly aerated They must be taught, before any treatment is applied, to breathe properly, for which purpose the spiroscope, after Pescher s method is the best

(*D*) Patients with gastroptosis *have weak muscles* A rational and special physical culture is advisable and ought to be employed at the same time as the other remedies, otherwise all these latter will fail The best exercise for re-education of the muscles is *reptation*

(*E*) Patients with gastroptosis *are mentally affected* and grumblers with inadequacy of the glandular system they are constantly tired, and continually complaining of their different symptoms. They are low-spirited and asthenic It is absolutely necessary to give them confidence in themselves, and to re-educate their mental outlook At the same time as their mental condition is being treated and as an adjuvant, they should be stimulated by thyroidal and suprarenal treatment together with injections of oxygen and with hæmostyl so that the conjunction of the psychical and physical treatment may bring back to them their former confidence in them selves

(*F*) The operator ought to notice the results obtained from a *radioscopical examination* If a simple abdominal belt suitably maintain the stomach in position and remove the different symptoms,

it is probable fixation will produce the same result If the operator find the peristaltic action of the stomach be well preserved, the result will also be satisfactory If on the contrary, the stomach be very hypotonic, there is little hope of a permanent success Lastly, the operator should fix firmly the position of the stomach, he cannot always expect to see the latter ascend to its proper height but there is no cause for anxiety if the stomach be permanently lower, it is not necessary for the stomach to be replaced in position to obtain a therapeutical result, but it must be *fixed*, so that the patient's movements, such as rising from the recumbent to the standing position, do not cause elongation of the stomach or dragging on the solar plexus. *Fixity* of the stomach is more important than its replacement The most rational operation is that of Perthes—*i e*, suspension of the stomach by means of the falciform ligament of the liver

The operation consists in separating this ligament at the level of the umbilicus freeing its whole length as far as the inferior border of the liver where it is normally inserted, fixing it along the lesser curvature of the stomach from the pylorus to the cardiac end and bringing it across the left abdominal wall it is then fastened to a rib The length of the ligament varies from 9 to 12 centimetres, with a mean of 12 centimetres If this be not sufficient, the operator mobilises the abdominal aponeurosis which covers the rectus, draws the flap from before backwards through a hole in the muscle brings it into the abdominal cavity and joins it to the free extremity of the falciform ligament This new artificial ligament completes the former

The operation is performed as follows median laparotomy to the left so as not to cut the falciform ligament The latter is mobilised preserving as much of the serous and fatty tissue as possible to keep it vascularised it is then fixed to the anterior surface of the stomach 1 centimetre below the small curvature

The thick extremity of the ligament is pierced by a silk thread the two ends of which are knotted twice round the free extremity of the thin portion so that the terminal part of the ligament is strengthened by a double silk thread parallel to it The ligament and thread are passed by a blunt needle into the thickness of the gastric wall excavating in this way a tunnel in the muscle The thickness of the gastric wall is pierced by an aneurism needle which is brought out some centimetres distant beginning about 2 centimetres from the pylorus and continued as far as possible to the

cardiac region The stitch should be a kind of running stitch, the ligament being strengthened in the whole extent by silk thread, five or six stitches parallel to the small curvature are necessary The last running stitch is passed into the wall of the stomach 7 or 8 centimetres from the cardiac end, immediately below the line where the left hepatic lobe rests on the stomach—i e, at the place where it is normally in contact with the anterior abdominal wall The intra parietal falciform ligament should pass into the muscular tunic of the stomach beneath the gastric vessels

In the region of the pylorus the sero-muscular layer is not so easily raised as in the other parts of the stomach, with the result that the instrument passes near the superficial layers of the sero-muscular coat

The new gastric fixation ligament is then tied to the left costal margin in the following way the ligature is drawn into the abdominal cavity, at the level of the xiphoid cartilage, at the upper border of the incision three fingers breadth to the left in the aponeurosis of the rectus muscle

The terminal end is passed as follows the aneurism needle is introduced from without inwards into an intercostal space, it is brought into the abdominal cavity, and the thread and anterior extremity of the ligament are drawn upon and the terminal end of the thread is fixed to the aponeurosis of the rectus after having pierced the muscle The stomach is thus suspended and raised, but the operation is not finished. The ligament must be fixed in its canal within the stomach by some stitches to the serous surfaces Each stitch should include both the ligament and the sero-muscular layer

The objection may be raised that these serous stitches shorten the anterior wall of the stomach this is of no importance, since, in cases of gastroptosis or laxity of the stomach, the organ is some what dilated Moreover, in our first operations, we performed anterior fixation and plication of the posterior wall of the stomach at the same time.

The falciform ligament may be too short, in that case add a "lengthening piece" Perthes recommends the following procedure separate the skin on the left side and take away a flap of the aponeurosis from the anterior sheath of the rectus 3 centimetres broad and 8 centimetres long preserving its pedicle above This new ligament is used to lengthen the falciform ligament Push it through a hole in the muscle with forceps into the abdominal cavity,

and suture it to the end of the falciform ligament, after having passed it, if necessary, into the tunnel in the stomach The traction on it gives it the form of a cord

Ptosis of the liver is often associated with that of the stomach It produces few symptoms, and is not caused by a kink in the duodenum, like gastroptosis, it need not detain us Moreover, owing to the fixation of the falciform ligament to the left costal arch, the liver obtains a certain amount of immobility But, if it be desirable to suspend the liver, a flap should be cut from the sheath of the rectus, passed into the abdomen through a hole in the muscle, and fixed to the falciform ligament at the upper surface of the liver, the latter is in this way supported by means of the ligament Fixation should take place at the point where the falciform ligament emerges from the liver which is fixed to the right costal arch

Immediate Results—The shape of the stomach, at the end of the operation approaches the normal the pylorus is raised so that the duodenal kink no longer exists the small curvature is oblique, and more rectangular, or at least slightly curved at the pylorus

Radioscopy confirms the elevated position of the pylorus and of the small curvature

Future Results.—Three out of four cases are cured these are Perthes figures with which ours agree

The results are very good, therefore, in three out of four cases

These figures are better than those obtained by Rovsing s method —*i e* fixation of the stomach by sutures to the abdominal wall. Our figures are one-third cured or much improved, one-third slightly improved, one-third, no permanent result

In 155 cases Rovsing noted

Cured	92 = 59 *per cent.*
Marked improvement	24 = 15·5 ,,
Improvement	10 = 6·5
Moderate or no improvement	21 = 14
Dead	8 = 5

A mortality of 5 per cent seems to me excessive

Why are opinions divided as regards the future therapeutic results of gastropexy ?

Why, according to some observers are they bad or nil ? Why according to others, are they very good ?

Because probably the statistics are drawn up in different ways If one observer note the results obtained from a collection made

promiscuously, from the statistics of various surgeons, these results will be certainly bad, but, on the contrary if he only study a series of one observer's cases of this operation, the results will be much better, because a surgeon who performs an operation often will have good results, whilst his neighbour who rarely undertakes it will have bad ones The former has perfected his technique, the latter's procedure is faulty, the former chooses his cases and well studies the indications, the latter, on the contrary operates rather at haphazard and is discouraged by his want of early success Hence the cause of the difference of opinion *One operation is usually of no value to the operator*

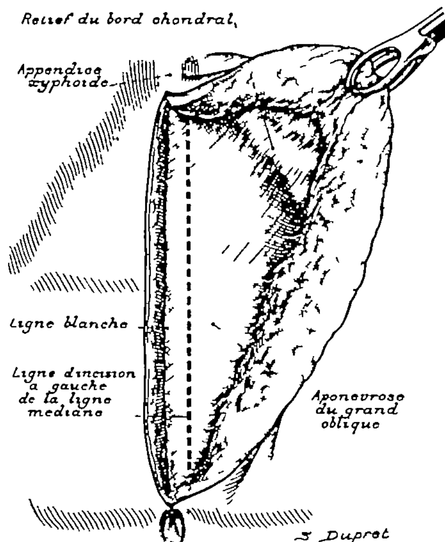


FIG. 14.—LAXITY OF THE STOMACH. GASTROPEXY.

The skin has been divided in the middle line, the aponeurosis of the anterior sheath of the rectus slightly to the left of it. The subcutaneous tissue has been separated so as to expose the first intercostal spaces at the level of the costal margin, in order to obtain access to one of the intercostal spaces, where the suspensory ligament of the liver which has become the suspensory ligament of the stomach, will pass in order to be fixed to the abdominal wall. Bleeding must be arrested with the greatest care from now onwards.

("Gastroptosis" is an incorrect word: we should rather use the words "laxity of the stomach.")

Relief du bord chondral = Outline of the costal margin. *Appendice xyphoïde* = Xiphoid cartilage. *Ligne blanche* = Linea alba. *Ligne d'incision à gauche de la ligne médiane* = Line of incision to the left of the middle line. *Aponévrose du grand oblique* = Aponeurosis of the external oblique.

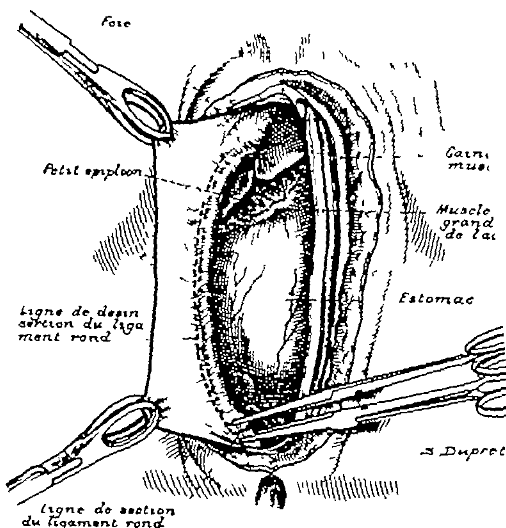


FIG 16.—LAXITY OF THE STOMACH. GASTROPEXY

The peritoneum has been opened a little to the left of the middle line in this way operator sees the whole of the falciform ligament which is to be divided close to t umbilicus; it is to be freed up to the point where it enters the liver The stomach therefore suspended on the one hand by the liver and on the other by means of t intercostal space through which the ligament is passed.

Foie = Liver *Gaine du muscle* = Sheath of the muscle *Petit épiploon* = Small omentum *Muscle grand dro t de l'abdomen* = Rectus abdominis *Estomac* = Stomach. *Ligne d dés nserti on du l gament rond* = Line of separation of the falciform ligament *Ligne de section du l gament rond* = Line of division of the falciform ligament

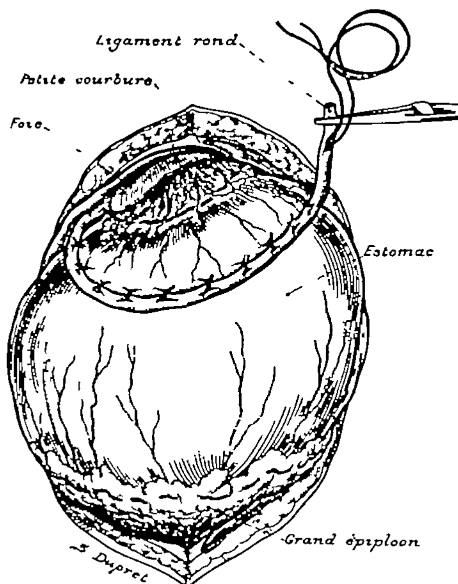


FIG. 16.—LAXITY OF THE STOMACH. GASTROPEXY

How the falciform ligament is fixed to the anterior surface of the stomach: fixation is carried out about a thumb's breadth from the small curvature. A series of interrupted stitches of slowly absorbable catgut fastens the upper border of the ligament to the serous coat of the stomach. Note, the end of the ligament is pierced by a linen thread in order to lengthen the former and by this thread the ligament is fixed to the intercostal space.

Ligament rond = Falciform ligament. *Petite courbure* = Small curvature *Foie* = Liver
Estomac = Stomach. *Grand épiploon* = Great omentum.

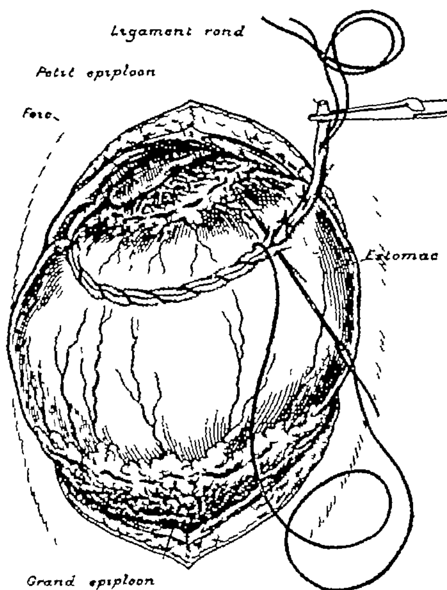


FIG 17.—LAXITY OF THE STOMACH. GASTROPEXY

The falciform ligament has been fixed by a series of interrupted stitches; a continuous suture of slowly absorbable catgut buries the whole length of the ligament.

Ligament rond = Falciform ligament *Petit épiploon* = Small omentum *Foie* = Liver
Estomac = Stomach *Grand épiploon* = Great omentum

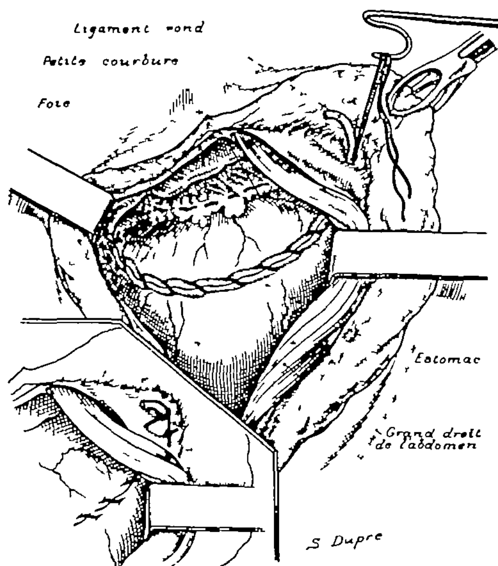


FIG 18 —LAXITY OF THE STOMACH. GASTROPEXY

The falciform ligament has been fixed to an intercostal space by Deschamps needle. At the left and below note the way the linen thread is fastened to the sheath of the rectus muscle.

Ligament rond=Falciform ligament *Petite courbure*=Small curvature. *Foie*=Liver *Estomac*=Stomach. *Grand droit de l'abdomen*=Rectus abdominis

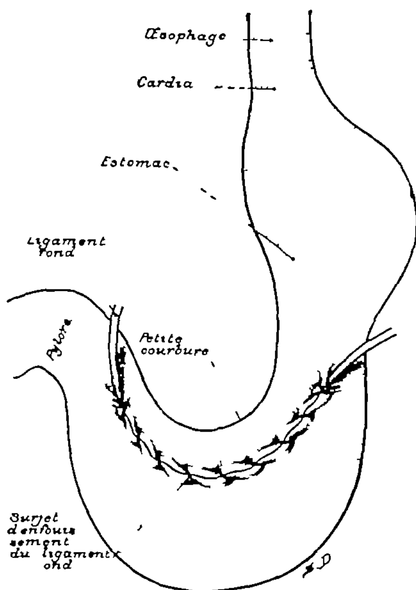


FIG 10.—LAXITY OF THE STOMACH. GASTROPEXY

The appearance of the stomach when the falciform ligament has been buried under the serous coat. The small tuberosity need only be fixed; the great tuberosity does not move.

Œsophage=Œsophagus *Cardia*=Cardiac end of the stomach. *Estomac*=Stomach *Ligament rond*=Falciform ligament *Pylore*=Pylorus *Petite courbure*=Small curvature. *Surjet d'enfouissement du ligament rond*=Continuous suture burying the falciform ligament

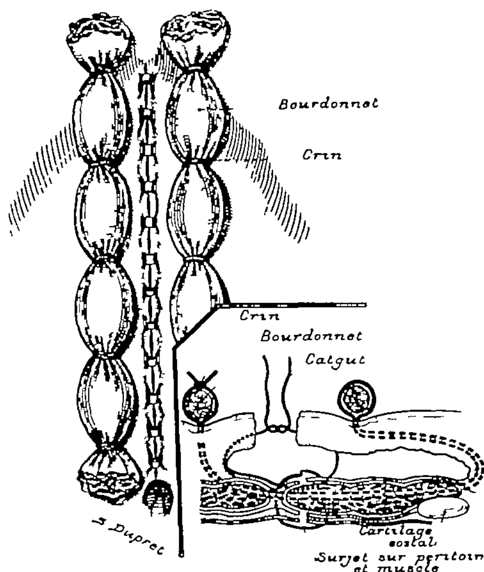


FIG 20.—LAXITY OF THE STOMACH. GASTROPEXY

At the left, the appearance of the wall when the suture is finished in the middle, the suture with clips and at the side, two pledgets of lint with strong silkworm gut, which includes *en masse* the different parts of the abdominal wall. At the right particulars of the suture in the intercostal space for the purpose of showing the whole empty space must be suppressed, so as to avoid hæmatomata tying two pledgets of lint with silk worm gut around the separated subcutaneous space makes the production of a hæmatoma impossible. Note the different points of the suture in the peritoneum, in the muscles, and in the subcutaneous cellular tissue

Bourdonnet—Pledget of lint *Crin*—Silkworm gut. *Catgut*—Catgut. *Cartilage costal*—Costal cartilage *Surjet sur péritoine et muscle*—Continuous suture to the peritoneum and to the muscle

II

BILOCULAR STOMACH

A BILOCULAR stomach is characterised by a constriction dividing the stomach into two parts, and giving it the appearance of an hour glass, two pockets are thus formed an upper, or cardiac, and a lower, or pyloric, communicating with each other by a canal or by a con stricted area

ETIOLOGY —The condition may be due to one of the three following causes

(a) *A Spasm* —A contraction of the circular layer of the muscle of the stomach in the vicinity of an ulcer A depression like the blow of an axe is formed on the greater exactly opposite the ulcer in the smaller curvature

(b) *Induration of the Gastric Walls formed by a Callous Ulcer* —The ulcer is sometimes accompanied by peri-gastritis and is sur rounded by adhesions The submucosa and the subserous coat become thickened, and immobilise the central part of the organ between two pockets which are still supple and contractile

(c) *Cicatrisation of a Healed Ulcer and Fibrous Contraction of the Cicatrix* —The constriction includes the submucous and the muscular coats

We have operated upon forty cases of non-cancerous stenosis of the middle of the stomach In only seven cases was the contrac- tion noted during the operation to be due to a cured and cicatrised ulcer a fibrous ring was situated between the two pockets In the other thirty three cases an ulcer was still in process of evolution, and in about half of these cases *the ulcer was a perforating one* it had destroyed the wall of the stomach and had penetrated into the neighbouring organs the liver, the pancreas and the abdominal wall

It can be stated therefore that a bilocular stomach shows two totally different appearances sometimes it is like an hour glass, formed by two supple pockets, connected by a fibrous canal, with an ulcer which has been cured for a long time, and sometimes the ulcer which may or may not be a perforating one, is in full activity The

constricted portion is formed by an ulcer with callous edges The indications for operation ought to be different in the two cases

We, however, employ the same treatment in both, but, on principle, it is better to undertake different methods of treatment

Pathological Anatomy—*Constriction in the Middle of the Stomach*—Its site varies with that of the ulcer which has caused it. Sometimes it is placed high up, and the superior pocket is small sometimes it is low down, near the pylorus, and the inferior pocket is of feeble dimensions and the upper pocket is, therefore, very large

The constriction takes the form of an incomplete ring, whose circle is broken at the greater curvature It is generally excentric near the smaller curvature. A fibrous, shiny, white cicatrix, more or less hidden by the peri gastric lesions, is to be observed in the peritoneum In numbers of cases we have found in the constricted area an ulcer perforating into the pancreas into the liver, and into the anterior abdominal wall, sometimes even into two or three of these parts at the same time

A bilocular stomach, as seen at an operation, is not always like an hour-glass, as revealed by the X rays The true hour-glass stomach is that in which the constriction is formed by a small cicatricial canal, where there is a healed ulcer, but the majority of the radioscopical images answer to ulcers still active In the perforating forms a spot corresponding to the diverticulum is found, fixed between two dark strands which represent the two pockets

Cardiac Pocket—It is generally large for two reasons first, because the ulcer is situated nearer the pylorus than the cardiac end and secondly, because the weight of the food has distended the upper pocket

In six cases the cardiac pocket was small, and after resection of the stomach we had great difficulty in implanting the gastric extremity into the jejunum or into the inferior pocket

Pyloric Pocket—It is often smaller than the cardiac pocket, but the reverse is met with

Varieties—Apart from the common form, we have observed the following varieties

(*a*) Stenosis in the middle of the stomach combined with duodenal stenosis

(*b*) Stenosis associated with an ulcer which had perforated into the abdominal wall into the liver and into the pancreas

(c) Stenosis in the middle of the stomach from cancerous degeneration of an ulcer

(d) Stenosis from an ulcer surrounded by a peri-gastric abscess

(e) A gastro-colic fistula in the retracted and ulcerated portion

SYMPTOMS —*Premonitory Symptoms of Gastric Ulcer*—The syndrome of gastric ulcer, vomiting, pain, and hæmorrhage is rare Most usually, the patient complains of (a) *hyperchlorhydria* (acid regurgitations), (b) *transitory periods of dyspepsia* and of pain alternating with absolute quiescence which lead to the belief that the ulcer is cured, this intermittent acid dyspepsia compels the patient, for many years, to take periodically Vichy water and inert powders

Functional Disturbances—These are not due to the stenosis in the stomach, but rather to the chronic ulcer which has produced the stenosis If the ulcer has perforated the patient complains of continuous pain at the commencement of a meal, and acute pain, like a needle going into the flesh, in the epigastrium and radiating to the back

Vomiting—It is the rule and is frequent and repeated, it is due to the stenosis or to the ulcer If it be due to the stenosis, it corresponds to the evacuation of the distended cardiac pocket The first vomit is mucoid, the second contains food, the symptom hardly differs from that met with in pyloric stenosis

General State—Asthenia and anæmia are due to cachexia from starvation resulting from stenosis either of the pylorus or of the mid gastric region

Clinical Signs—Inspection and palpation furnish very little, except the same information as is given in cases of pyloric stenosis Distension dilatation of the stomach, peristaltic contractions, may occur with the pain if the lesion be not far from the pylorus A mass is to be found on palpation, if there be a callous ulcer with perigastritis

Tubage and Lavage.—Fasting twelve hours after a meal, tubage may remove remains of food, as in pyloric stenosis

The following phenomenon may be noted after lavage

The stomach having been washed out and emptied by the tube, percussion produces a splashing sound in the pyloric pocket, and the water removed, which is at first clear, suddenly becomes thick from food particles which have regurgitated from the said pocket

RADIOSCOPY —This gives convincing results The other signs, so to speak do not count It should be carried out twelve hours

after a bismuth meal The normal stomach takes the form of a J, if it be bilocular, two shadows are seen joined together by a clear space. It is rather a shadow consisting of two parts, arranged on a nearly vertical axis, or obliquely below and to the right Sometimes the two shadows are distinct, one above and to the left, taking a conical shape subjacent to a chamber containing air, and the other below and to the right, separated from the first by a streak (in cases of perforating ulcers), this second pocket forms a segment of a circle with the convexity below, but does not contain a chamber of air On pressure with the finger, the two gastric pockets are mobile It is impossible to empty the cardiac pocket into the pyloric one, or to make the contents of the pyloric regurgitate into the cardiac pocket

A true bilocular stomach must not be confounded with ptosis of the stomach. Palpation under the screen shows the homogeneity of the organ and the suppleness of its walls A stomach with ptosis fills like an inert sac, and becomes elongated from the weight of liquids, its centre becomes narrowed, and it then resembles a bilocular stomach. In cases of bilocular stenosis, the bilocular image never varies on palpation, on repeated examinations or from atropine

SURGICAL TREATMENT —The surgeon cannot state in advance what operation he will perform He must know *de visu* if the stenosis be formed by an active ulcer or if it be the result of a com pletely cured one, in addition he must find out if hyperchlorhydria be present or not The latter has only a relative value, because if the constriction be sufficiently high up, the cardiac segment is too small to secrete a large amount of acid. But, on principle, if the hyperchlorhydria be even very slight, the resection of the stomach should generally be very extensive If, on the contrary, the hyper chlorhydria be feeble, or normal, a palliative operation can be per formed I call it palliative (gastro-gastrostomy, gastroplasty), but it is none the less a serious operation because personally, in every case whatever the cause of the bilocular stomach, I perform a mid gastric resection or a hemi gastrectomy I anastomose the cardiac pocket with the duodenum (gastro-duodenostomy), or make a gastro-jejunostomy if the interval separating the duodenal pocket be too extensive

Gastro-gastrostomy consists in anastomosing the superior with the inferior pocket

Gastroplasty consists in excising the constriction in the axis of the stomach and transforming the longitudinal wound into a

vertical suture, so that each pocket communicates with its neighbour by means of a very large opening. If there be no hyperchlorhydria, the two palliative procedures are satisfactory; if hyperchlorhydria exist, I discountenance them, because there are serious chances of a secondary ulcer being engrafted on the suture. It is better to perform hemigastrectomy.

Personally, *I always perform gastrectomy,* whether the ulcer be active or not. I remove the inferior pocket and the diseased, ulcerated, or fibrous area, and keep as little as possible of the upper pocket, which, according to the case, is anastomosed with the duodenum or implanted into the jejunum. In every case in which pyloric and duodenal stenosis exists it is necessary to resect the pyloric pocket and to complete the operation by implantation of the cardiac pocket into the jejunum.

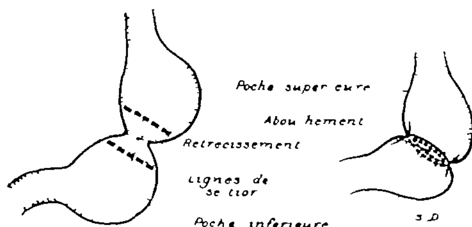


FIG. 21.—STENOSIS IN THE MIDDLE OF THE STOMACH.

Gastro-gastrostomy. The upper pocket communicates with the lower one by an anastomosis of the stomach to the stomach. (Operation hardly to be recommended.)

Poche supérieure=Superior pocket. *Abouchement*=Anastomosis. *Rétrécissement*=Constriction. *Lignes de section*=Lines of section. *Poche inférieure*=Inferior pocket.

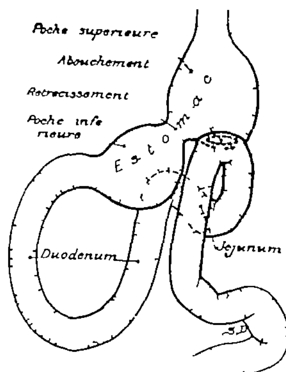


FIG 22 —STENOSIS IN THE MIDDLE OF THE STOMACH.

Gastro-enterostomy with the superior pocket. (Operation hardly to be recommended.)

Poche supérieure=Superior pocket *Abouchement*=Anastomosis *Rétrécissement*=Constriction. *Poche inférieure*=Inferior pocket. *Estomac*=Stomach. *Jéjunum*=Jejunum *Duodénum*=Duodenum

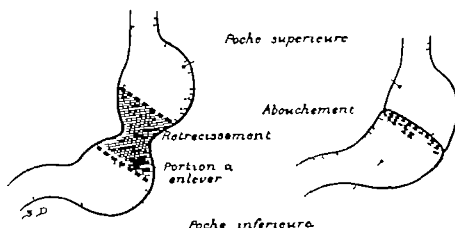


FIG 23 —STENOSIS IN THE MIDDLE OF THE STOMACH

Resection of the middle of the stomach followed by end to-end gastro-gastrostomy (Good operation.)

Poche supérieure=Superior pocket *Abouchement*=Anastomosis *Rétrécissement*=Constriction *Portion à enlever*=Portion to be removed *Poche inférieure*=Inferior pocket

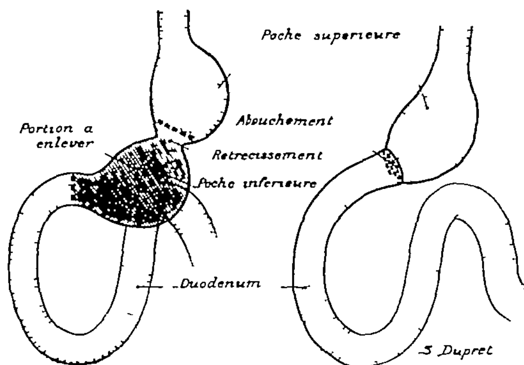


Fig 24.—Stenosis in the Middle of the Stomach.

Gastro-pylorectomy followed by gastro-duodenal anastomosis (Péan). (The best operation.)

Poche supérieure=Superior pocket. *Abouchement*=Anastomosis *Rétrécissement*=Con striction. *Portion à enlever*=Portion to be removed. *Poche inférieure*=Inferior pocket. *Duodénum*=Duodenum.

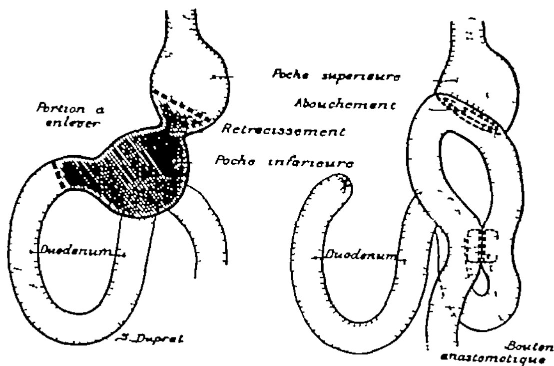


Fig 25.—Stenosis in the Middle of the Stomach.

Gastro-pylorectomy followed by gastro-jejunal implantation. (Very good operation.)

Poche supérieure=Superior pocket *Abouchement*=Anastomosis *Rétrécissement*=Constriction *Poche inférieure*=Inferior pocket. *Portion à enlever*=Portion to be removed. *Duodénum*=Duodenum *Bouton anastomotique*=Anastomotic button.

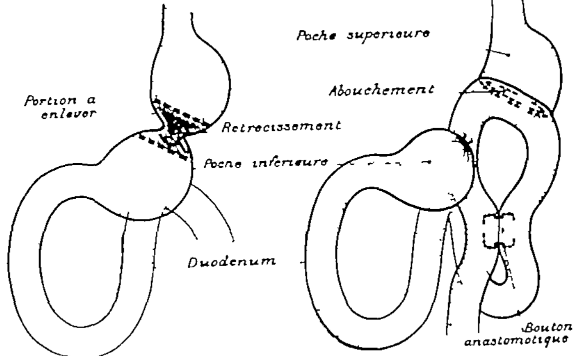


Fig 26.—Stenosis in the Middle of the Stomach

Resection of the middle of the stomach, followed by gastro-jejunostomy by implantation, without removal of the inferior pocket. (Good operation.)

Poche supérieure=Superior pocket *Abouchement*=Anastomosis *Portion à enlever*=Portion to be removed *Rétrécissement*=Constriction. *Poche inférieure*=Inferior pocket. *Duodénum*=Duodenum *Bouton anastomotique*=Anastomotic button.

Fig 27.—Stenosis of the Stomach Situated High Up

Incision of the wall The operator has first made an incision from the umbilicus to the xiphoid cartilage The space not being sufficient, a transverse incision in L has been required.

Ligne d'incision=Line of incision

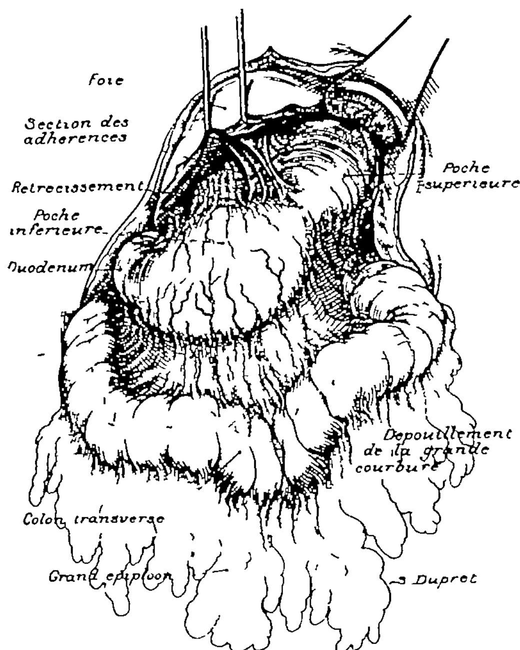


FIG 28.—STENOSIS OF THE STOMACH SITUATED HIGH UP

Appearance of the lesion the inferior pocket is very large the superior one is narrow and contracted. The adhesions arising from the cicatrised ulcer join the liver to the superior pocket. The dotted line shows where the greater curvature is to be stripped by the compress (Témoin). Above below the liver the adhesions which must be freed.

Foie=Liver *Section des adhérences*=Division of the adhesions *Poche supérieure*=Superior pocket *Rétrécissement*=Constriction. *Poche inférieure*=Inferior pocket *Duodenum*=Duodenum *Depouillement de la grande courbure*=Stripping the greater curvature *Côlon transverse*=Transverse colon. *Grand épiploon*=Great omentum.

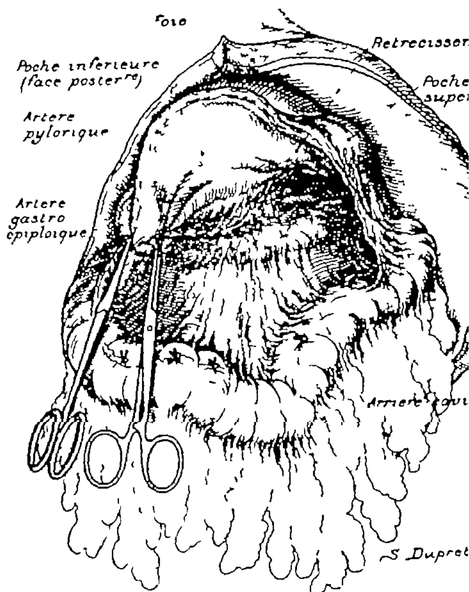


FIG 29.—STENOSIS OF THE STOMACH SITUATED HIGH UP

After stripping the greater curvature over the inferior pocket the stomach is ra
right gastro-epiploic and the pyloric artery are tied and divided.

Foie = Liver *Poche inférieure (face postérre)* = Posterior surface of the inferi *Rétrécissement* = Constriction. *Artère pylorique* = Pyloric artery *Poche s* Superior pocket *Artère gastro-épiploïque* = Gastro-epiploic artery *Arriè* Posterior cavity



Fig 30—Stenosis of the Stomach Situated High Up
Two duck bill forceps between which the duodenum is divided.

Ligne de section du duodénum—Line of division of the duodenum.

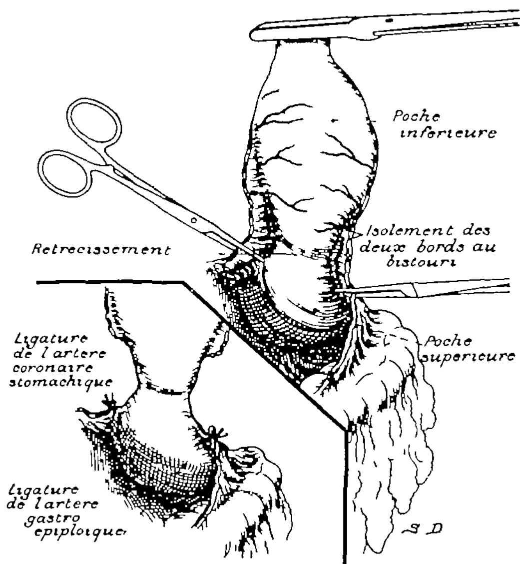


FIG 31 —STENOSIS OF THE STOMACH SITUATED HIGH UP

Separation of the small and large omentum at the stenosis. This division is to be made with the knife.

Poche inférieure = Inferior pocket *Isolement des deux bords au bistouri* = Separation of the two borders by the knife *Rétrécissement* = Constriction *Poche supérieure* = Superior pocket *Ligature de l'artère coronaire stomachique* = Ligature of the coronary artery *Ligature de l'artère gastro-épiploïque* = Ligature of the gastro-epiploic artery

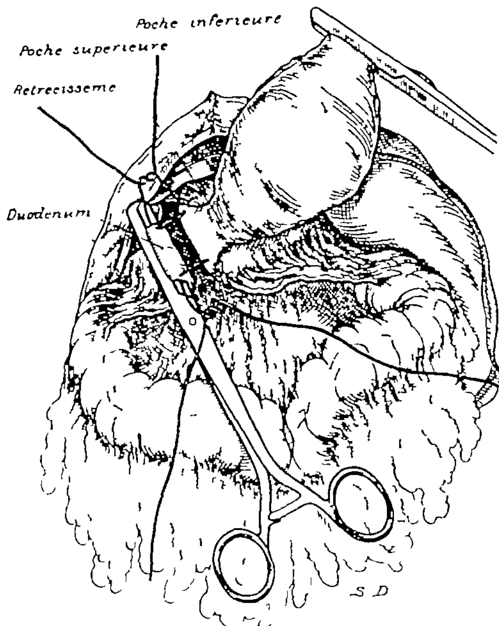


FIG 32.—STENOSIS OF THE STOMACH SITUATED HIGH UP

The operator decides to anastomose the superior pocket directly with the duodenum, because the case "lends" itself. The superior pocket is very narrow the duodenum is long and the patient's chest contracted, conditions favourable for end-to-end anastomosis. Two chromic catgut stitches are placed between the superior and inferior borders of the duodenum and the corresponding borders of the small pocket, the calibre of which answers nearly exactly to the breadth of the duodenum.

Poche inférieure—Inferior pocket. *Poche supérieure*—Superior pocket. *Rétrécissement*—Constriction. *Duodenum*—Duodenum

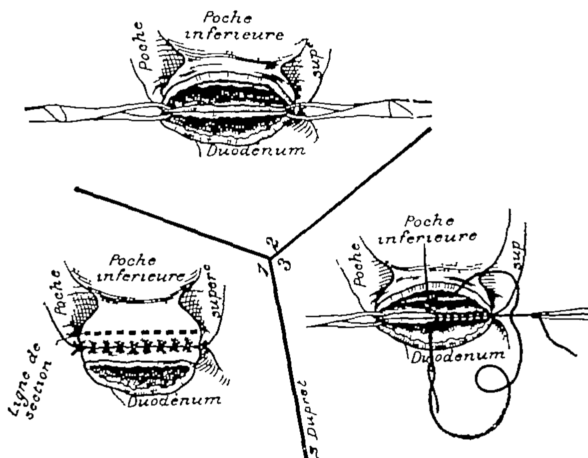


Fig 33.—Stenosis of the Stomach Situated High Up

Posterior suture of the serous surfaces with interrupted stitches, and division of the superior pocket immediately below the constriction. Through-and through suture with button-hole stitch to the posterior gastro-duodenal edge.

Poche inférieure=Inferior pocket *Poche supérieure*=Superior pocket *Ligne de section*=Line of incision *Duodénum*=Duodenum

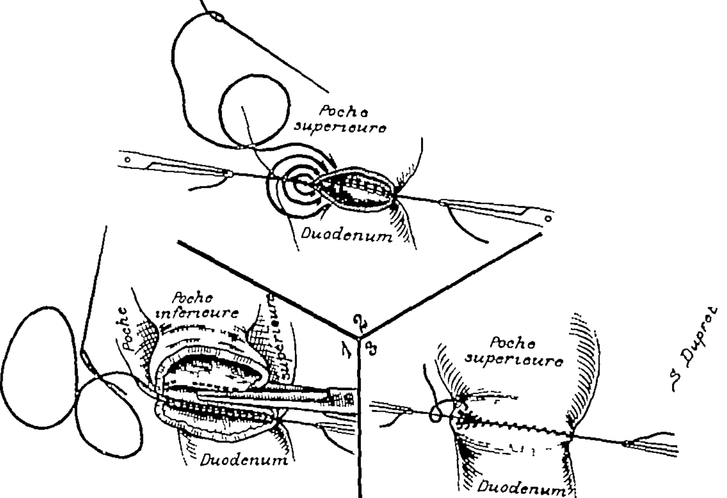


FIG 34.—STENOSIS OF THE STOMACH SITUATED HIGH UP

1 Division of the superior pocket 1 centimetre above the constriction. 2 How to make a burying continuous suture, so that the mucosa protrudes into the gastro-duodenal cavity 3 Anterior continuous suture of the serous surfaces.

Poche supérieure=Superior pocket *Poche inférieure*=Inferior pocket *Duodénum*=Duodenum

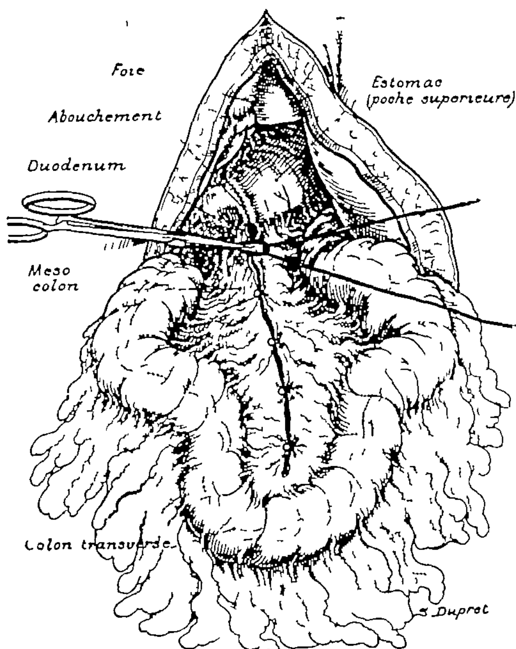


FIG 35.—STENOSIS OF THE STOMACH SITUATED HIGH UP

Appearance of the completed gastro-duodenal anastomosis. Closure of the opening resulting from stripping the omentum from the greater curvature.

Foie = Liver *Estomac (poche supérieure)* = Stomach (superior pocket). *Abouchement* = Anastomosis *Duodénum* = Duodenum *Méso-côlon* = Meso-colon *Côlon transverse* = Transverse colon

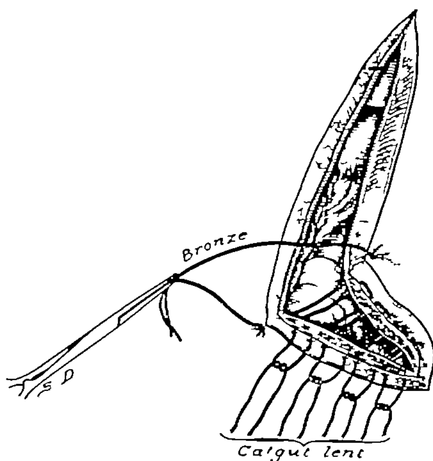


FIG 38.—STENOSIS OF THE STOMACH SITUATED HIGH UP

Closure of the transverse incision in the abdomen. A wire stitch in the angle. Four stitches in U with slowly absorbable catgut.

Bronze=Bronze wire *Catgut lent*=Slowly absorbable catgut.

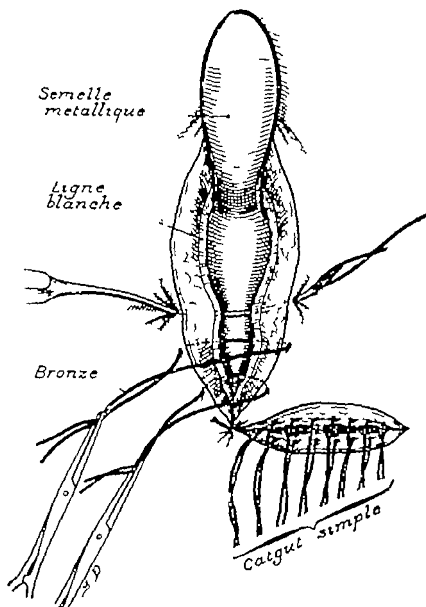


FIG 37 —STENOSIS OF THE STOMACH SITUATED HIGH UP

Closure at one level of the middle line Note the rôle of the trowel. Suture of the aponeurosis over the transverse incision.

Semelle métallique = Metal trowel. *Ligne blanche* = Linea alba *Bronze* = Bronze wi
Catgut simple = Ordinary catgut

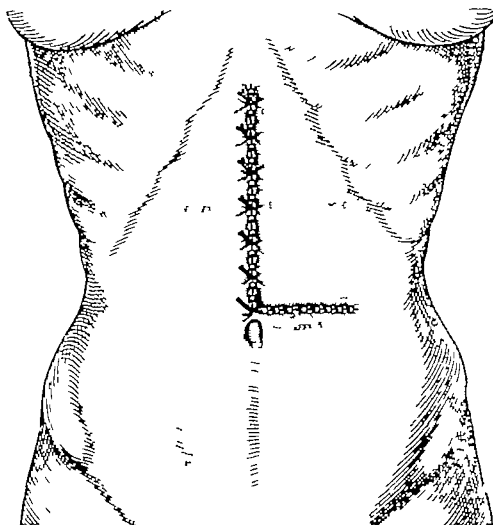


FIG. 38.—STENOSIS OF THE STOMACH SITUATED HIGH UP
Suture of the skin.

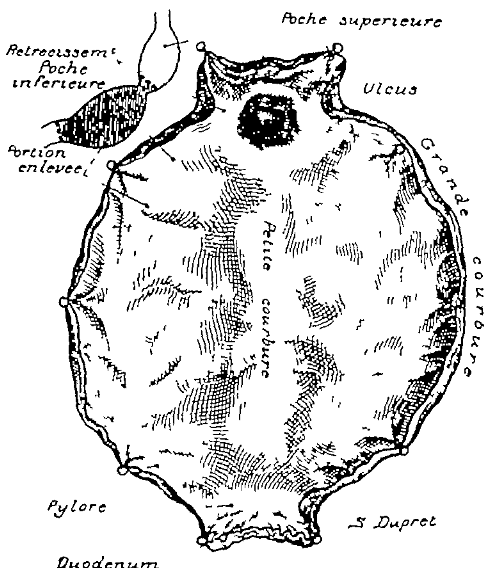


FIG 30 —STENOSIS OF THE STOMACH SITUATED HIGH UP

Appearance of the portion removed. The ulcer which caused the stenosis is seen. The duodenum has been cut close to the pylorus, above the constriction, about 1 centimetre from the normal gastric mucous membrane.

Poche supérieure=Superior pocket *Rétrécissement*=Constriction *Poche inférieure*=Inferior pocket *Ulcus*=Ulcer *Portion enlevée*=Portion removed *Grande courbure*=Greater curvature *Petite courbure*=Smaller curvature *Pylore*=Pylorus *Duodénum*=Duodenum

III

NEUROTOMY OF THE STOMACH

By R. de BUTLER D ORMOND
Surgeon of the Hospital at Amiens

Latarjet's Operation

Sometimes during a laparotomy for gastric or for duodenal ulcer the surgeon does not discover any disease This may occur even in patients thoroughly examined by a trained medical expert, and in those who have submitted to an extensive surgical exploration, in addition to the help obtained from dissection of the omentum from the colon. Finding nothing in the stomach, the surgeon then explores the whole abdomen, the gall bladder, the appendix, the colon and the end of the ileum and if the gall bladder be healthy (bluish in colour), and there be no ptosis of the colon or kinks by Lane's bands, there is nothing to explain the symptoms of which the patient complains, it is then the idea should suggest itself that the symptoms are due to vagotonia or to sympathicotonia

Katsch and Westphal formerly described a neurotic form of duodenal ulcer, and Bircher later noted a like syndrome in connection with the stomach It is characterised by symptoms of hypertonicity and hypermobility discoverable by radioscopy and detectable clinically by vomiting, false signs of pyloric stenosis and by slight hæmatemesis the acidity of the stomach is increased

This syndrome is deceptive when an ulcer produces the principal manifestations of *gastric vagotonia* Such a patient treated by gastro-enterostomy receives no benefit from the operation and suffers from more symptoms than formerly

Desjardins arrived at the conclusion that ulcer is perhaps, the representative of a syndrome characterised by increase of the contractility of the stomach by spasm of the pylorus and by hyperacidity It was only one step to conclude that the terminal branches of the pneumogastric nerves played an important part

However that may be there is another undeniable fact—viz some patients still suffer from painful hypertonic dyspeptic symptoms,

although treated by gastro-enterostomy, or better by resection of the stomach, for an existent characteristic lesion, there is added, therefore, to the anatomical lesion an affection of the vagal or sympathetic gastric nervous system. It is difficult to lay down exactly the part each of the nervous elements plays in the painful gastric syndrome, and it was this that led Latarjet to operate directly on the nerves of the stomach by dividing the branches supplying it

THE NERVES OF THE STOMACH —The nervous branches which innervate the stomach come from the two pneumogastrics and from the sympathetic system by means of the cœliac plexus

They can be divided into three pedicles one to the small curvature, one to the pylorus, and one in association with the right gastro-epiploic artery

There are, in addition, some sympathetic fillets following the splenic artery, but they are inconstant, and always very feeble

Complete or partial division of these nerves has shown the existence of special visceral centres which can cause movement of the stomach, similar to the special ganglia of the heart It has also demonstrated the important part played by the nerves of the pylorus in the action of the latter

The classical facts of anatomy have shown that the nervous supply of the stomach can be divided into two systems the right and left pneumogastric and the sympathetic The distribution of these different branches has been exactly described There are, indeed, two systems, each controlling an independent area, and the nervous elements are intimately connected in their distribution to the organ and also in the tissues of the main trunks There exist, moreover, anastomoses between the two systems Each part of the stomach can be said to be supplied both by the sympathetic and the vagus nerves The nerves of the stomach arise from the vagus nerves and from the cœliac plexus either directly or by means of the hepatic nerves as Latarjet has shown.

The branches which come from the vagus assure the nerve-supply to a definite part of the stomach, arising in front at the cardiac end where the left pneumogastric becomes anterior and enlarges It divides into five or six branches, and follows the anterior border of the small curvature in front of the artery and below the fold of peritoneum

The posterior and right vagus is symmetrical, and lies at its origin behind the artery and beneath the serous coat The nerves descend on to the small curvature and on to the surfaces, and end at the

termination of the pyloric canal From the experiments I carried out last winter in the theatre at Amiens, with the help of Drs Carron and Frank, interne of the hospital—performed less for the purpose of making exact observations on the anatomy than for studying the easy means of access to the nerves for operative purposes—I noted there were only three or four large trunks over the anterior border of the small curvature, the principal one of which followed the small curvature, and gave off in its course branches which passed quickly to the neighbourhood of the small curvature, so that if the principal trunk were raised, the appearance was like that of the skeleton of a pike In the majority of cases, one or two larger fillets were seen, and these descended on to the anterior surface of the stomach I was astonished not to find more of them These fillets are very important, as we shall see, for discovering the nerve when studying the operation of neurotomy

To sum up, there are three or four principal branches passing along the whole length of the anterior border of the small curvature, and arising from them accessory fillets, which are rapidly exhausted in the coats of the superior border of the stomach. The posterior branches found on turning back the stomach are less numerous, and have an analogous distribution.

The pylorus is innervated by branches which arise chiefly from the hepatic nerves (Latarjet) They fall perpendicularly like a "shower" on to the pyloric canal and on to the bulb of the duodenum, they are three or four in number I have always found them very feeble and often difficult to detect They are discovered on opening the anterior layer of the gastro-hepatic omentum The right coronary artery is surrounded by nervous fillets which accompany it, and are distributed over the surface of the greater curvature, and are still more difficult to find

To sum up, *the nerves of the stomach form three pedicles, the most important of which is that of the small curvature, forming two levels, separated by the vascular level* The second is the pyloric pedicle and the third, quite accessory, is that of the right gastro-epiploic artery There is a considerable inosculation between the hepatic and the anterior pneumogastric nerves

The nerve-supply is therefore, segmentary, and we see that the pyloric canal one of the most important parts of the stomach, is well supplied by a system of nerves

PHYSIOLOGY OF THE NERVE SUPPLY —Experimental researches are often quite contradictory, and there are no certain observations

regarding the physiology Lesbre and Maignon are of the opinion that the motor phenomena are due to the vagus, the motor properties of which are obtained from the spinal cord. Some consider that vagotomy slows and enfeebles the movements of the stomach, others, that it produces no symptoms and others again, that the results are contradictory

Lastly, Morat and Doyon believe there are two kinds of fibres, excitatory and inhibitory, these different actions can be explained by granting that the action of the vagi is not simple, but varies with rest or with activity of the organ The same uncertainty exists regarding the sympathetic, some admit an inhibitory or arresting action, others that excitation produces mobility, the action of the sympathetic is, in fact, not always the same It inhibits the longitudinal and circular fibres of the whole organ, if the latter be in a state of contraction, and also furnishes both motor and inhibitory fillets to certain regions, as the cardiac end and the pylorus

As regards the latter, in particular, agreement is far from being established, for some consider that the action of the sphincter is due to the vagus, and others the motor and inhibitory fibres belong to the sympathetic, which, as far as the digestive and urinary systems are concerned, acts especially on the sphincter Changes in the evacuation of the stomach have not been noted by Aldenhoff and von Mering after double vagotomy, extirpation of the cœliac plexus, and the formation of a duodenal fistula The vasomotor action is no better established, after removal of the cœliac plexus, it is generally allowed, hyperæmia of the gastric walls is produced.

The sensory nerves belong to the sympathetic but to a certain degree the vagus is a sensory nerve

The nerves of the vegetative system have a much more general action They are the seat of deep organic sensations, collected under the name of cœnesthesia, which give the impression of well being, or on the contrary of malaise anxiety state and of lipothymia They also have an influence on the character

The disturbances of the vegetative nerves are frequent, they show themselves by pain, by collapse and by a choleraic condition and are especially noted in the peritoneum, in hæmorrhage of the pancreas, and in neuritis of the solar plexus following ulceration or cancer

Muco membranous colitis is the result of a vegetative nervous affection and lastly the group of gastro-intestinal neuroses is due to disturbance in the function of these nerves

The therapeutical attempts made in the gastric crises of tabes have provided some exact knowledge on this point Cambecedès and I, in the service of Professor Carnot, at the hospital Beaujon, in 1920, anæsthetised the splanchnic nerves to arrest the gastric crises of tabes The method is described in the book on local anæsthesia by Victor Pauchet and Sourdat, with the modification we reported in our thesis, following the works of Billet, Jalifier, and Laborde In every case the crises ceased immediately

It would be difficult, and perhaps rash, to assert what is the part played by nervous action in the formation of ulcer, for the experiments made on this subject are uncertain

In view of all these contradictory facts, it is difficult to hold an exact opinion regarding the physiology of the nerves of the stomach, but one important fact is to be noted double vagotomy, together with removal of the cœliac plexus, leaves the motor action of the stomach intact. This makes some authors grant the existence of a special nervous system of an automatic kind, ganglionic in nature, sufficient to give effect to the local organic functions.

EXPERIMENTAL RESULTS OF NEUROTOMY —These different views have served as a foundation for the experiments of Latarjet,* of which the following is a summary

Complete or partial neurotomy of the stomach is devoid of any danger

The stomach can be divided into two distinct segments The vertical portion plays the part of a reservoir, and the nerves of the lesser curvature are responsible for its muscular tone, which is diminished when the nerves are divided.

The other or motor segment—i e ' discharging cone '—consists of the vestibule and the pyloric canal. In this part the influence of the pyloric nerves is considerable Division of the nerves of the lesser curvature and of the pylorus does not suppress the movement of the stomach but the organ is placed at rest by diminution in the frequency of the peristaltic waves Evacuation is slowed at the cost of a certain degree of dilatation, acquired from the reservoir The nerves of the lesser curvature possess also a vaso-constrictor action, manifested in the walls After neurotomy the acidity should be diminished but research is still required on this point.

During recent years there has been a tendency to emphasise the influence of the nervous system in the different pathological syndromes

* Latarjet and Wertheimer *Journal de Médecine de Lyon*, November 5, 1921

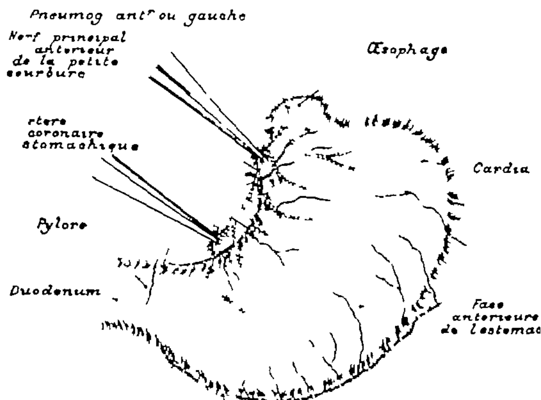


Fig 40—Neurotomy of the Stomach (Latarjet's Operation)

Exposure of the anterior gastric nerve.

Pneumog antr ou gauche—Anterior or left pneumogastric nerve *Nerf principal antérieur de la petite courbure*—Principal anterior nerve of the small curvature *Œsophage*—Œsophagus *Artère coronaire stomachique*—Coronary artery *Cardia*—Cardiac end *Pylore*—Pylorus *Duodénum*—Duodenum *Face antérieure de l'estomac*—Anterior surface of the stomach.

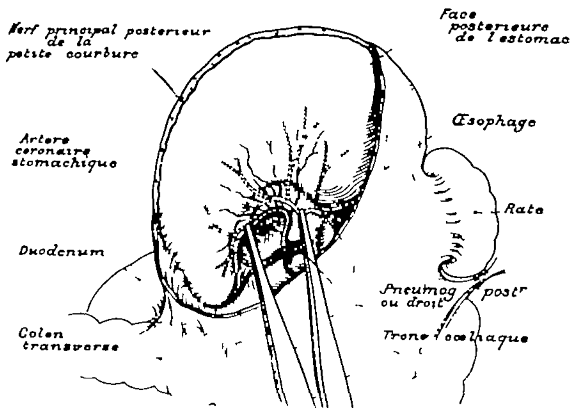


FIG 41 —NEUROTOMY OF THE STOMACH (LATARJET'S OPERATION).
Resection of the posterior gastric nerve.

Nerf principal postérieur de la petite courbure—Principal posterior nerve of the small curvature *Face postérieure de l'estomac*—Posterior surface of the stomach *Œsophage*—Œsophagus *Artère coronaire stomachique*—Coronary artery *Rate*—Spleen *Duodénum*—Duodenum. *Pneumog postr ou droit*—Posterior or right pneumogastric nerve *Tronc cœliaque*—Cœliac axis. *Côlon transverse*—Transverse colon

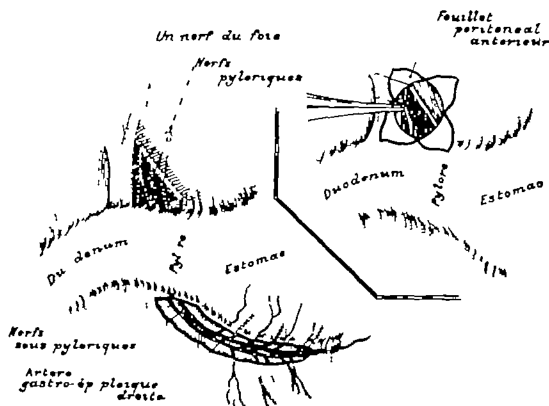


FIG 42 —NEUROTOMY OF THE STOMACH (LATARJET'S OPERATION).

Exposure and resection of the supra and sub-pyloric nerves. Note, these nerves pass perpendicularly on to the pylorus and on to the duodenum. The termination like the skeleton of a pike is well seen. The pyloric nerves are difficult to reach: it is necessary at the same time to resect the pyloric artery for some centimetres, to be certain of having caught the supra pyloric nerves with the vessels.

Fouillet péritoneal antérieur—Anterior fold of the peritoneum *Un nerf du foie*—An hepatic nerve *Nerfs pyloriques*—Pyloric nerves *Duodénum*—Duodenum *Pylore*—Pylorus *Estomac*—Stomach *Nerfs sous pyloriques*—Sub-pyloric nerves *Artère gastro-épiploïque droite*—Right gastro-epiploic artery

IV

DUODENAL OR SUB-PYLORIC STRICTURE

ANATOMICALLY, stricture of the pylorus hardly exists Every stenosis called pyloric arises either from the duodenum or from the stomach We do not think we have ever met with a primary lesion out of the hundreds of stomachs and duodenums we have resected The so-called pyloric stricture is the result of a simple, of a callous, or of a cancerous ulcer

The so-called juxta pyloric strictures are either supra pyloric—*i.e*, gastric or sub-pyloric—*i.e.*, duodenal

We may call to mind that duodenal is more frequent than gastric ulcer, especially in man, out of four ulcers in the male, three are duodenal

What Treatment should be Adopted?—That depends on many factors

(*a*) *What are the Existing Conditions?*—Can the duodenum be reached easily? Is it large or movable? If so the operation is easy Can the large curvature of the stomach be brought in contact with the duodenum? There can be no possible doubt, perform *gastro-duodenostomy* (Finney), see Vol V, Chap V

(*b*) The duodenal stricture is cured, supple and fibrous The fibrosis is at an end with stenosis, but the ulcer is inactive If the ulcer be still active, the ideal operation consists in *resection of the duodenum* This is especially indicated if, at the same time, there be hæmorrhage and pain because of the presence or risk of perforation But the operation is difficult, and requires a certain amount of surgical skill. The resection should include more or less of the stomach according as the hyperchlorhydria be slight, absent, or increased. (For a full consideration of this subject see Vol. II and Chap V Vol. V)

In all other cases, perform gastro-enterostomy, the best of all is gastro-enterostomy with a short loop (see Vol II, p 151)

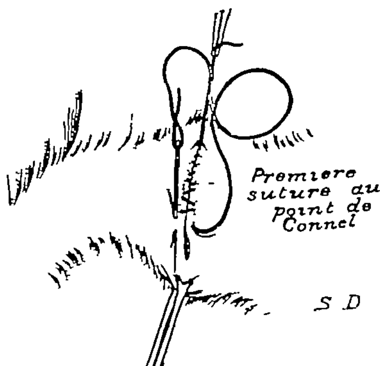


FIG. 45.—PYLOROPLASTY

After careful hæmostasis, the operator makes a first layer by a through and-through suture which invaginates the gastric edge.

Première suture du point de Connel—First suture with Connel s stitch.

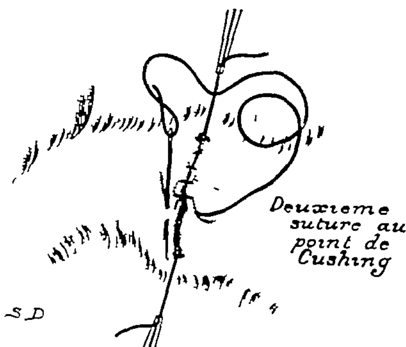


FIG 46.—PYLOROPLASTY

The preceding suture should suffice but for greater security an upper purely sero-serous suture is applied. The reader will note that the longitudinal incision is changed into a vertical one which increases the size of the pylorus and facilitates the passage of the gastric contents into the duodenum.

Deuxième suture du point de Cushing—Second suture with Cushing s stitch.

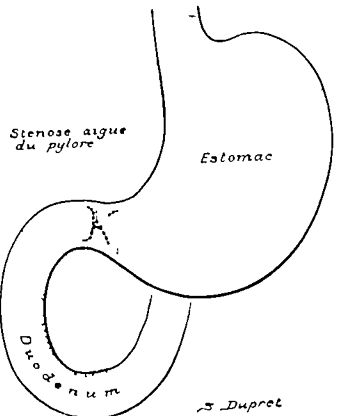


FIG 47.—STRICTURE OF THE FIRST PART OF THE DUODENUM, DUE TO A CICATRISED ULCER.

This is the common cause of a tight stenosis of the pylorus.

Sténose aiguë du pylore=Acute stenosis of the pylorus. *Estomac*=Stomach *Duodénum*=Duodenum

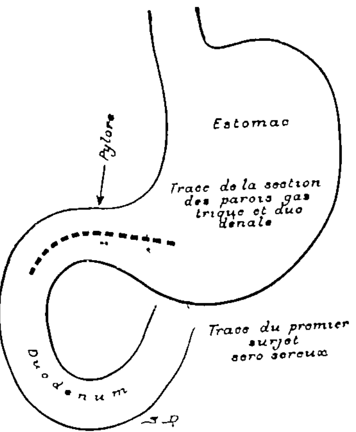


FIG 48.—STRICTURE OF THE FIRST PART OF THE DUODENUM DUE TO A CICATRISED ULCER.

In this case the operation is very simple. The operator commences by making a continuous suture uniting the first part of the duodenum and a portion of the second with the anterior surface of the stomach, as near as possible to the great curvature. The finer dotted line indicates the place of the first continuous suture (see Fig 45) The thicker dotted line corresponds to the incision of the gastric and of the duodenal walls.

Estomac=Stomach *Pylore*=Pylorus *Tracé de la section des parois gastrique et duodenale*=Tracing of the incision of the gastric and of the duodenal walls *Tracé du premier surjet séro-séreux*=Tracing of the first sero-serous continuous suture. *Duodénum*=Duodenum.

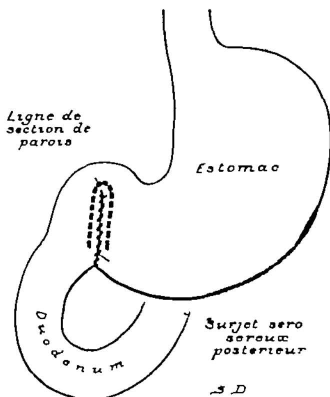


FIG 49.—STRICTURE OF THE FIRST PART OF THE DUODENUM, DUE TO A CICATRISED ULCER. A sero-serous continuous suture joining the great curvature of the stomach and the duodenal wall (first portion and a part of the second) The dotted line indicates the incision of the stricture of the healthy walls of the stomach and of the duodenum. This division should be made 2 or 3 millimetres from the suture.

Ligne de section des parois=Line of incision of the walls *Estomac*=Stomach. *Surjet séro-séreux postérieur*=Posterior sero-serous continuous suture. *Duodénum*=Duodenum

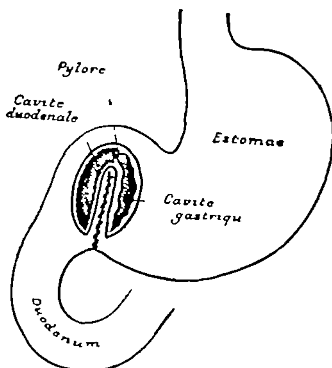


FIG. 50.—STRICTURE OF THE FIRST PART OF THE DUODENUM DUE TO A CICATRISED ULCER. Appearance of the organs after the incision has been made on the duodenum, on the stomach and over the stricture.

Pylore=Pylorus *Cavité duodénale*=Cavity of the duodenum. *Estomac*=Stomach *Cavité gastrique*=Cavity of the stomach. *Duodénum*=Duodenum

V

COUNTER-FISTULA IN THE SMALL INTESTINE

A TEMPORARY fistula in the small intestine is produced by the insertion of a narrow rubber tube (No 25), and by fixation of the perforated loop to the abdominal wall It has two different purposes drainage of the intestine and feeding the patient

Sugared water, drop by drop, and also food, to improve the general health can be introduced by the fistula which can also be used to remove the *gas in cases of obstruction, to preserve a suture* of an anastomosis below and to prevent obstruction, if there be any risk of the anastomosis functionating imperfectly

Two objections have been raised against this operation

(*a*) Suture of the small intestine to the abdominal wall can predispose later to a kink and to intestinal obstruction

(*b*) A permanent fistula of the small intestine may be produced

These two objections are fair, but they fall to the ground, because nothing is easier than to remove the fistula and the adhesion of the intestine, if indication should arise.

Generally, the intestinal adhesion to the wall disappears *per se* We have had the opportunity of operating later on on patients in whom such a fistula had been made the intestine was found to be completely separated from the abdominal wall Also, we have had frequent *occasion to close the fistula, in order to obtain a more* rapid cure Four or five days after fixation, the adhesions were soft, and closure of the intestine easy

These two objections are then of no importance in contrast with the security obtained in certain conditions by this complementary operation

INDICATIONS—*Jejunostomy* —If a gastric ulcer be inoperable—in other words, if an operation appear too serious—and naturally whilst awaiting a radical cure, the general health of the patient must be supported and improved a preliminary jejunostomy is sometimes indicated followed by fixation of the convex loop to the wall The patient can be fed drop by drop, and by frequent meals

until he is sufficiently strong to bear a radical cure The fistula is then easily suppressed

Jejunostomy is also indicated in patients *in extremis*, on whom gastro-enterostomy has been performed, and in whom we can reckon on the immediate absorption of the liquids introduced Jejunostomy should be performed at the same time as gastro-enterostomy, and fluid injected drop by drop immediately At the end of eight days, or later, the tube should be removed, the fistula heals spontaneously

After Intestinal Obstruction—In a case of volvulus of the small intestine, the operator reduces the twist but the patient s state may be precarious, and intestinal peristalsis slower, the patient may die of stercoræmia, although the obstacle is removed In these conditions, if a fistula be made in the small intestine discharge of the fæcal matters and gas is at once assured In addition, the nurse can introduce fluid drop by drop in order to hydrate the patient Directly the discharge of fæcal matters is re-established, the tube can be withdrawn The fistula closes spontaneously or it can be removed surgically It may be necessary to suture quickly the intestine, because the digestive juices run the risk of being lost in the dressing, this loss, together with auto-digestion of the skin, weakens the subject

The slightest discharge should be immediately stopped For this purpose the operator should remove a few stitches, exteriorise the loop of the small intestine, and close it All the cases I have treated in this way have been cured

After the Operations for Chronic Intestinal Stasis—This condition is very frequent, and one of the most widespread of diseases (see Vol I, Lane s disease)

Operation should be performed in a great number of cases (see p 122 of this volume) After any of the operations, for reasons of which we are ignorant signs of obstruction may occur for a few days When this can be foreseen, and perhaps in every case a temporary fistula should be systematically made in the ileum The last loop of the small intestine should be fixed to the abdominal wall a Nélaton s catheter or a rubber tube introduced and at the end of five or six days, when the discharge of fæcal matters has become normal, the catheter should be removed cure takes place without incident

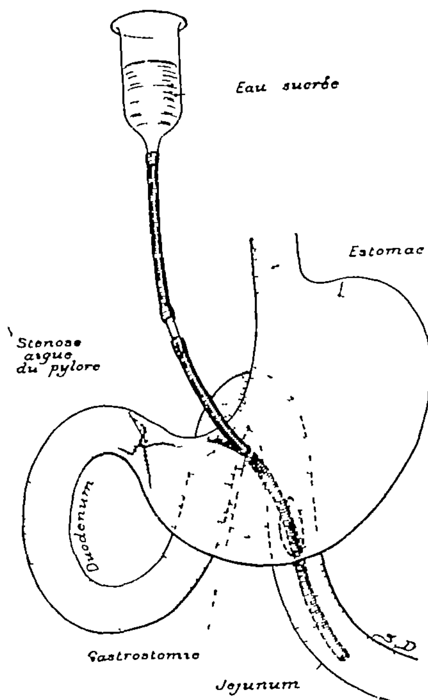


FIG 55.—GASTRIC SURGERY IN DEHYDRATED CACHECTIC PATIENTS: GASTRO-ENTEROSTOMY BY RICARD'S METHOD (VERTICAL SUSPENSION), FOLLOWED BY GASTROTOMY

Nélaton's catheter introduced into the stomach and passing into the jejunum through the anastomosis, allows by immediate drop-by drop instillation the patient to be hydrated. This introduction is more efficacious than an injection of serum or rectal injections. The sugared water can be replaced very quickly by milk or by nutrient liquids, which are rapidly absorbed by the intestine. Some patients are too weak to eat immediately after the operation. Directly the patient can take a sufficient amount of nourishment by the mouth, the tube is removed. Closure of the fistula is rapid.

Eau sucrée—Sugared water *Estomac*—Stomach. *Sténose aiguë du pylore*—Acute stenosis of the pylorus *Duodenum*—Duodenum. *Gastrostomie*—Gastrostomy *Jéjunum*—Jejunum

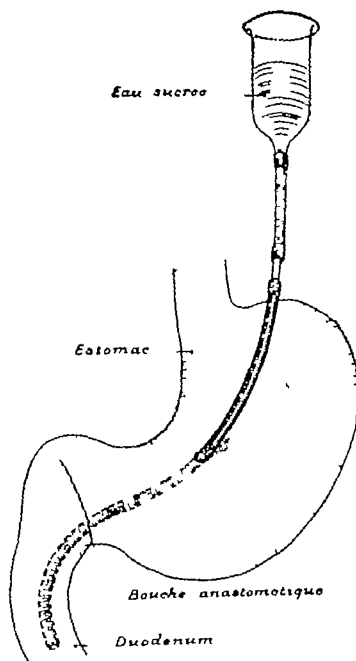


FIG 66.—GASTRIC SURGERY IN DEHYDRATED CACHECTIC PATIENTS: INSTALLATION OF GASTRIC FEEDING DIRECTLY AFTER THE OPERATION OF GASTRO-DUODENOSTOMY

The gastro-duodenostomy is above the gastro-enterostomy It cannot, like the preceding produce a jejunal ulcer

Eau sucrée=Sugared water *Estomac*=Stomach *Bouche anastomotique*=Anastomosis. *Duodénum*=Duodenum

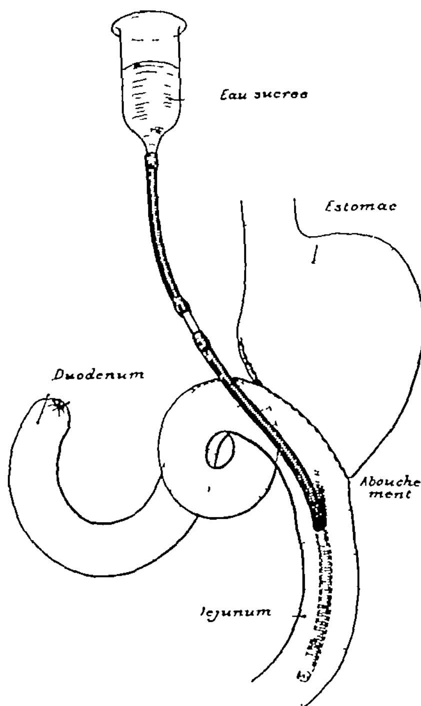


FIG 57 —GASTRIC SURGERY IN DEHYDRATED CACHECTIC PATIENTS INSTILLATION INTO THE JEJUNUM AFTER GASTRECTOMY

The tube has been introduced directly into the jejunum, because the stomach is too contracted to allow of a gastrostomy The jejunum is in direct contact with the median line of the operation, and it is here the sound is introduced after a large gastrectomy

Eau sucrée=Sugared water *Estomac*=Stomach. *Duodénum*=Duodenum. *Abouchement*=Anastomosis. *Jéjunum*=Jejunum

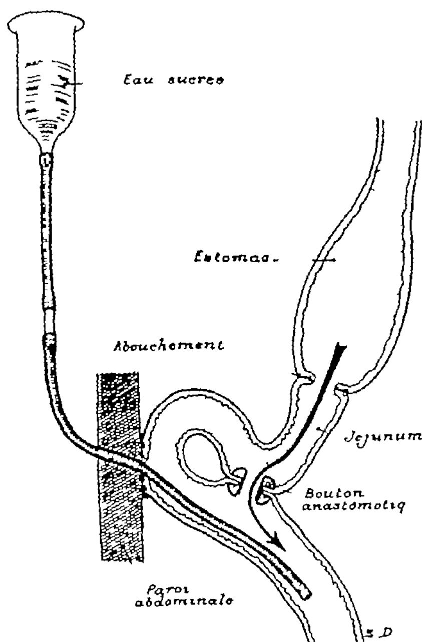


FIG 68.—GASTRIC SURGERY IN DEHYDRATED CACHECTIC PATIENTS: TEMPORARY JEJUNOSTOMY AFTER GASTRECTOMY FOLLOWED BY JEJUNO-JEJUNOSTOMY

The stomach is too contracted to allow of a gastrostomy The anastomotic button prevents the bile from regurgitation through the tube and through the orifice.

Eau sucrée=Sugared water *Estomac*=Stomach. *Abouchement*=Anastomosis *Jéjunum*=Jejunum *Bouton anastomotique*=Anastomotic button. *Paroi abdominale*=Abdominal wall.

VI

CÆCAL ANUS

Its indications are numerous

(a) Acute or chronic intestinal obstruction from a tumour of the large intestine.

(b) Infection of the large intestine ulcerative colitis, recto-colitis. The diversion of the discharges prevents irritation of the intestinal walls Emollient applications can be introduced by the anus

(c) Diversion of the discharges before colectomy It assures antecedent disinfection of the colon, and prevents infection after the operation

(d) Diversion of the discharges after colectomy or after amputation of the rectum, after complete excision of the rectum, even if a terminal left anus has been made cæcostomy is very useful, as it allows the gas to escape for some days

Cæcal anus must be distinguished from—

(a) *Appendicostomy* which does not divert the discharges, and serves simply for washing out the large intestine in cases of colitis or of serious recto-colitis

(b) *Counter fistula of the cæcum* a narrow cæcostomy, through which a rubber tube partially diverts the discharges and gas, in order to preserve the suture of the colon after a partial colectomy The rubber tube, large as a finger by friction passes through the cæcal wall when it is withdrawn the fistula closes *per se*

(c) *A cæcal anus properly so-called* is a very large opening which diverts all the discharges as far as possible it is an extremely unpleasant condition for the patient and for those around him but is the best way for completely deviating the discharges It is the best procedure when a colectomy is to be performed secondarily, so as to disinfect the intestinal end which is to be removed. It is also good practice in cases of serious intestinal obstruction, when it is advisable for the drainage to be abundant and immediate

A cæcal anus, whichever it be, should always be temporary but *its closure should be as simple and its existence as tolerable as possible.*

These different ways of making the anus are of great importance

costomy be performed, it is sufficient to remove the tube within the appendix for the fistula to close by itself If a simple fistula be made in the cæcum (narrow cæcostomy), simply removing the tube is likewise sufficient for spontaneous closure But if the cæcostomy be large—a cæcal anus—the latter must be closed The operation is certainly not difficult, or risky, provided it is performed at a suit able time I may mention that, in order to close the cæcal anus, the cæcum must be completely exteriorised, the suture should be made outside, and the intestine immediately returned into the abdomen The operation is absolutely without danger if well carried out, local anæsthesia suffices.

To understand the different stages in the formation of a large cæcal anus, examination of the annexed figure is sufficient

Be careful directly the anus is opened to protect the skin with dermatol or some ointment the essential thing is to renew the ointment often The patient ought to dress himself If the patient be bedridden, a bandage should not be applied, but a corset holding the whole dressing When the patient is able to get up and return to his work, he should wear an apparatus (always insufficient and incontinent) Fortunately, the cæcal anus is never permanent, it is only temporary

When a cæcal anus is necessary it should be got rid of directly the complementary operation, such as an ileo-sigmoidostomy or closure without any other operation, is possible according to the case If the disease in the large intestine (sigmoid) be inoperable, an iliac anus should be substituted for the cæcal one *Never leave a permanent cæcal anus* which is a painful infirmity Other forms of anus are bearable, especially if they be continent A cæcal anus is never continent it is a repugnant condition owing to the constant discharge of liquid matters in spite of the best apparatus An iliac anus, on the contrary is a bearable infirmity, re-education of the anus allows the patient to return to his duties without hindrance Most of the cases operated upon wear no apparatus Certain plastic operations (Lambret Cunéo) assure permanent and complete continence

When a cæcal anus precedes a right hemicolectomy (cancer or tuberculosis of the cæcum or of the ascending colon), it should be removed at the same time as the cæco-colic segment is resected

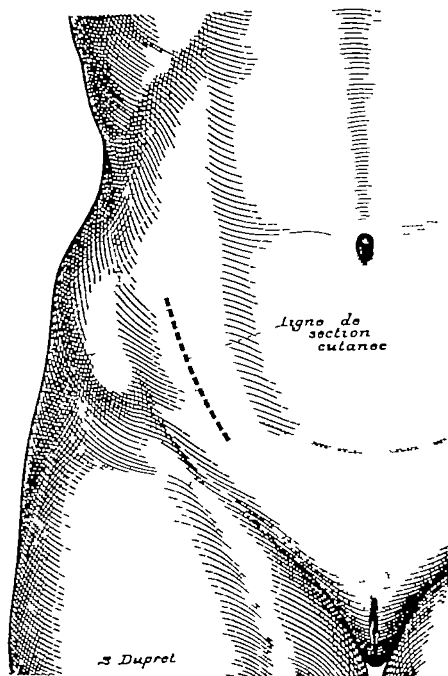


FIG. 59.—CÆCAL ANUS INCISION

The cutaneous incision is the same as for appendicectomy

Ligne de section cutanée=Line of cutaneous incision.

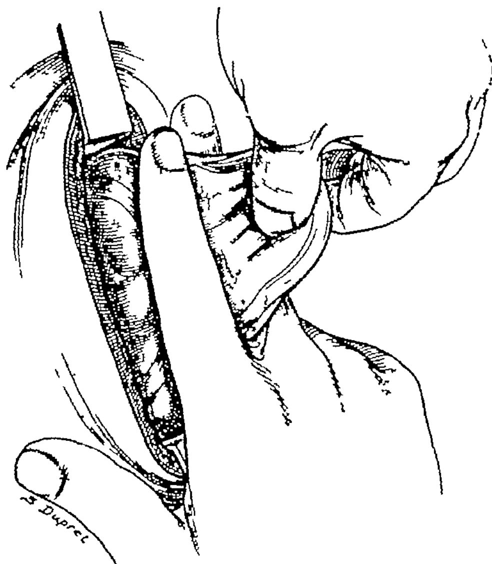


FIG. 60.—CÆCAL ANUS.

The whole length of the aponeurosis has been divided. The muscles have also been divided in the direction of the incision, contrary to what is done in an iliac anus. The operator endeavours to make the cæcal anus as incontinent as possible so as to divert the discharges completely; the muscles are divided instead of being separated. The division is, however unimportant, since the cæcal anus is always temporary and when closed, the surgeon should free the entire abdominal wall. The fingers press out the fæcal matters in the cæcum.

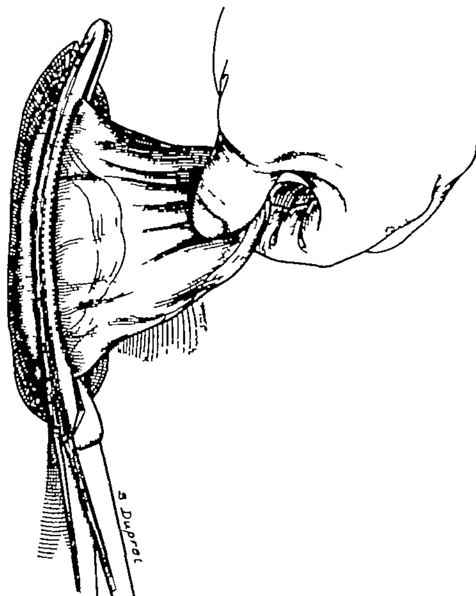


Fig. 61 —Cæcal Anus.

The cæcum, being quite empty by pressing out its contents, is compressed by a clamp. Note compression is so arranged as to preserve the two extremities of the instrument, which ought to overlap the wound.

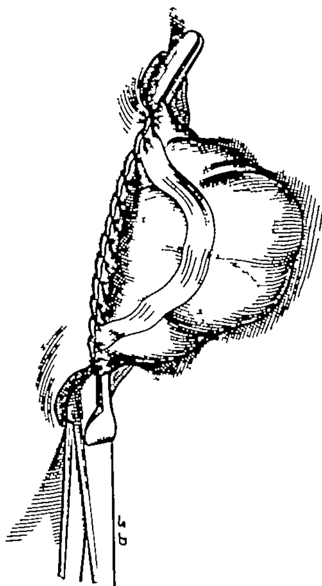


Fig. 62.—Cæcal Anus.

Two continuous sutures of fine catgut are passed on to each surface of the cæcum which is united to the skin only the clamp remains *in situ*

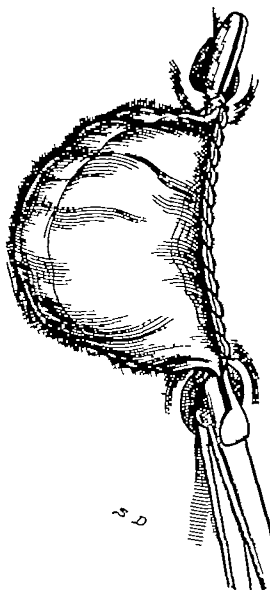


FIG 63.—CÆCAL ANUS.

Continuous suture of the left surface; the clamp remains *in situ*.

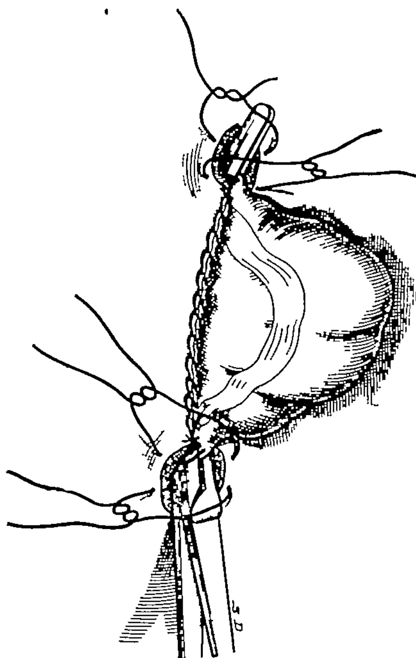


FIG 64.—CÆCAL ANUS.

Before withdrawing the clamp, the operator passes at the two extremities four interrupted stitches which are not tightened; the stitch includes only the skin and the fat near the cæcum; the wall of the organ is also pierced.

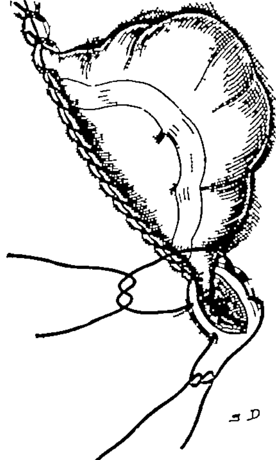


Fig 65.—Cæcal Anus.
The clamp is withdrawn, the two interrupted stitches are tied; those below will also be tied.

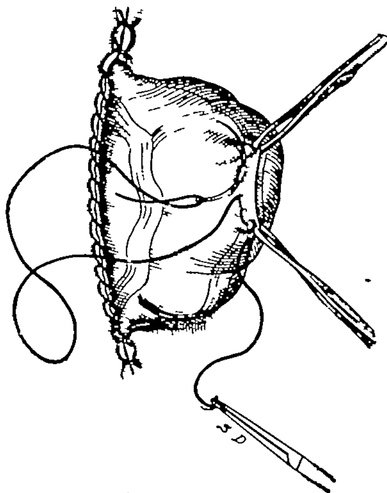


Fig 66.—Cæcal Anus.
A sero-serous purse-string suture is made at the top of the cæcum. Note, the cæcum is chiefly outside the abdomen.

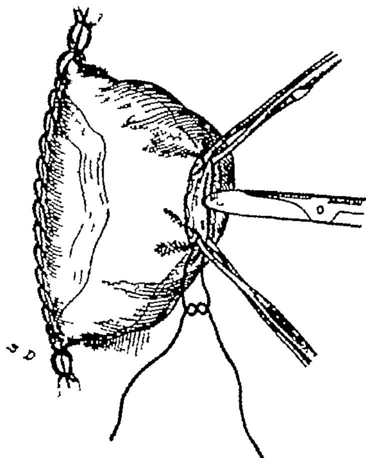


Fig. 67.—Cæcal Anus.
Opening the cæcum, in the centre of the purse-string stitch.



VII

TREATMENT OF TUMOURS OF THE LEFT COLON

Should an Obstruction of the Large Intestine be treated by Resection or by Anastomosis ?—No, make a cæcal anus, and only when drainage is perfect and the intestine no longer inflamed, attempt a radical cure In cases of acute obstruction from cancer, an exploratory laparotomy is not necessary, only after some weeks after the cæcostomy, when the patient is free from intoxication and well nourished, surgical excision should be considered.

Before operating on the colon, the patient must be prepared Give castor oil with belladonna and opium to suppress the intestinal spasm, and to make the laxative more efficacious At the same time as the administration of the castor oil give a pill of methylene blue or a dessertspoonful of vegetable charcoal, then watch for the appearance of the colouring substance in the stools The charcoal ought to appear twenty four or thirty-six hours afterwards, otherwise the intestine has not been emptied, and it is necessary to begin over again (Lockhart-Mummery) At the same time, give intestinal antiseptics or lactic ferments, give oil of paraffin also to soften the fæcal matters During this preparatory period the patient should take his ordinary food. Let three days intervene between the purgatives and the operation Be careful not to purge the patient the day before the operation The loss of one week for the preparation of the patient results in a gain during subsequent convalescence

Position and Incision —Turn the patient slightly on to the side and support him in this position with sand bags.

In tumours of the left colon (most frequent) make an oblique incision, starting from the median line about 4 centimetres above the pubis, and ending at the inferior angle of the twelfth rib, as if to expose the ureter Cut the skin and the abdominal aponeurosis, do not cut the rectus muscle, which is simply to be pulled to the right side.

The following are the advantages of this incision *

* Lockhart Mummery "Surgery of the Colon and of the Rectum." 1923 Baillière, London.

(a) Large exposure of the colon and of the lumbar fossa

(b) Fall of the small intestine to the right side, so that it does not impede the operator

(c) Division of a thick muscular wall which quickly cicatrises

(d) No division of nerves

(e) Easy liberation of the splenic flexure

Before making the incision the diagnosis must be certain, otherwise it is better to make a median incision

Methods of Anastomoses for the Repair of the Colon after Colectomy—*Should a Button be Used?*—The button is perfect for ileo-sigmoidostomy, it should not, on principle, be used for colectomy, because—

(a) It is not always discharged, a second operation is then required to remove it

(b) The *opening* left is small

The button, which has its indications in the ileum, is not, then, to be recommended for the large intestine, in this case anastomose by sutures

Should the Anastomosis be Side Side or End-to-End?—The former is more in vogue, because it is easier, but it is not to be recommended to a skilled surgeon who is not afraid of difficulties, because—

(a) It requires a greater length of intestine, and therefore a less complete exeresis, as the operator must have tissues for the anastomosis

(b) The operation takes a longer time than end to-end anastomosis

(c) The suture is not anatomical

(d) The two extremities closed in a cul-de-sac can lead to trouble owing to secondary elongation

There is no doubt end to-end anastomosis is more difficult Separation of the ends, which never occurs in the ileum, is frequent in the large intestine after the operation. It has been supposed that the disunion is due to the fæcal matters being septic and hard,* but this is wrong *The reason for the separation is the poorer vascularisation of its walls* in the small intestine there is a very large anastomosis between all the vessels which nourish its wall, in the colon the vascular supply is feebler, and *if the colon be cut perpendicularly to its axis the portion of the suture corresponding to its free border is badly supplied,*

* All the reasons are well described in the remarkable work of Lockhart Mummery (of London) "Surgery of the Colon and of the Rectum" (Baillière, London)

and sometimes separates Never cut a colon perpendicularly, but obliquely, on its free border, the incision should make an angle of 45 degrees with the axis of the colon If an autopsy be made on a patient who has died after a colectomy, death is always found to be due to separation of the free border—*i.e.*, the border opposite the mesentery This certainly does not depend on a faulty suture, but on the failure of the vascular supply, the method should not be blamed, but the anatomy of the colon

This risk does not exist in side-side anastomosis, because there is no danger of altering the circulation in the intestine, but the operator should prefer the axial anastomosis, because it is the better, this form of anastomosis is certain if the intestine be cut at an angle of 45 degrees, starting from the insertion of the mesentery, a great part of the intestine ought to be removed from the free border of the colon. This incision, like a "whistle," assures a good circulation of the sutured border, and more than that, it keeps the intestine wide open, it compensates for the contraction resulting from invagination of the sutured wall into the intestinal cavity

Lateral Anastomosis like the Barrel of a Gun.—This method of Mickulicz and Hartmann has the advantage of being extremely mild After the cancer of the colon has been resected, the two extremities are fixed to the skin, a terminal artificial anus results. The patient recovers well from the resection, but restoration of continuity is difficult, due to retraction and atrophy of the lower end. I rarely have recourse to it at the present time

End-to-End Anastomosis—The operator should take care to protect the edges of the wound, as well as the peritoneum, by means of compresses soaked in saline water and warm towels The gloves should be changed directly they have come in contact with the fæcal discharges, before passing to another stage of the operation, and especially before closing the abdominal wound

The part of the colon to be resected is to be marked out outside the wound, and the mesentery should be cut as far as possible towards the origin of the vessels, the mesenteric trunks should be tied, and two coprostatic clamps should be applied above and below the part to be removed The intestine is then to be divided with a bevelled edge—*i.e.*, in such a way that the wound makes an angle of 45 degrees with the axis of the colon (Lockhart-Mummery) The clamps should be opened so as to see if the free border of the intestine be well supplied by blood, and if the whole margin of the intestine bleed

normally, especially the border opposite the insertion of the mesentery particularly at the anal end and in fat people The two ends of the intestine should then be brought in contact, and so maintained either by Châput s forceps or by two stitches, which serve as landmarks The forceps should not be applied on the free and mesenteric borders, but in the middle of the lateral surfaces, so that the two mesenteric borders correspond to the middle of the suture If the mucosa appear excessive, it must be excised The work being thus pre pared, a through and through suture of fine catgut (000) should be passed from one side of the intestinal border to the other This suture, which should include all the tunics and be interrupted every four or five stitches, should be tied sufficiently to stop all bleeding, and the clamps should be opened from time to time to be sure hæmostasis is perfect When the posterior line of suture has been applied to the posterior borders of the intestinal lips, an anterior through and through continuous suture should be made The remainder of the suture should invert the mucosa into the intestinal cavity The needle should first prick the mucosa, pass out through the serous coat, and then pierce the serous coat of the opposite side and emerge through the mucous coat In this way, the edge is turned into the cavity of the colon. After the suture is finished the clamps should be removed, the soiled compresses and the gloves changed, and the intestine washed with saline water or with ether A catgut suture should bring the mesenteric borders into apposition. Examination should again be made to see that hæmostasis is perfect, the sutured mesenteric border ought not to bleed The suture at two levels being finished, complete the operation by epiplooplasty

This supplementary envelopment by the peritoneum prevents the sutures contracting adhesions with the small intestine and with the abdominal wall In addition, it consolidates the intestinal suture If the omentum can be drawn upon without too much traction, it can be fixed without being separated from its attachments to the stomach and to the colon but if there be any fear, owing to the traction of the formation of a future kink in the intestine, it is better to cut the omentum and make a free graft, the layer of the omentum freed from its attachments takes " very well, grafting should be tried every time it is necessary

The colo-colostomy being finished, a counter fistula should now be formed above the suture (colostomy) The opening should be made on the right in the cæcum, the incision is the same as for appendicitis The operator should draw on the cæcum, pass sero

serous purse-string suture, and then puncture the cæcum with a knife A rubber tube, 20 centimetres long, 25 broad, and the size of a finger, should be introduced by the opening into the intestinal cavity The tube should be fixed first by tightening the purse-string suture, and then by a complementary sero-serous stitch crossing at the same stage the tube at two points The intestine should be sutured to the parietal peritoneum by two stitches. The discharges and gas pass by the tube, and there is no tension on the anastomosis The abdominal wound should be protected from the tube, which eight days afterwards falls out by itself, the fistula need not be closed, as this occurs *per se*

There is nothing to be noted in particular as regards the post-operative treatment A small dose of castor oil should be given as required As soon as the oil has been given and digested, and the discharges eliminated by the anus or by the fistula, food should gradually be given.

Side-Side Anastomosis.—This anastomosis has the advantage of there being no risk to the nutrient supply of the colon, but the two culs-de-sac may later produce symptoms, because they may separate or become elongated

End-Side Anastomosis.—If there be chronic sub-occlusion, the part of the intestine above the tumour is, as a result of the distension much larger in calibre than the part below If the difference be only one-third or even two-fifths, end to-end anastomosis is still possible but if the disproportion between the two colons be too great end side implantation should be performed This procedure presents many advantages

(*a*) It assures immediate and easy drainage of the upper end of the colon, owing to the presence of a terminal artificial anus

(*b*) It does not threaten the line of suture, as the latter is not subjected to any tension, and there is no danger of its separation

(*c*) The cure of the anus is easy, it is sufficient to close the terminal part in a cul-de-sac close to the anastomosis—a mild operation.

Anastomosis of the Lower Part of the Sigmoid—Resection of a tumour at the junction of the sigmoid with the rectum ought to be performed in the dependent position. Then repair the bowel as follows

(*a*) Close the upper end of the rectum and abandon it, bring the stump of the sigmoid outside the abdomen and resect the diseased part and make a permanent anus. This procedure is sure and easy,

but deprives the patient of the function of his natural anus (Vol. III and Vol IV)

(*b*) Remove the rectum by the abdomino-perineal route, and lower the sigmoid stump into the normal anus This is an excellent procedure, but runs the risk of a 50 per cent mortality

(*c*) Follow Mayo's procedure (Vol. III, Chap VIII) It is applicable to resections of the end of the sigmoid, where it is difficult to suture the two ends of the colon at the floor of the pelvic cavity The surgeon having resected, the assistant should then introduce a curved clamp into the anus, the point of the clamp should pass out of the abdomen by the opening in the colon and become visible The surgeon should take a rubber tube, 25 centimetres long and the breadth of a finger, the upper extremity of which should have a lateral eye The upper end should be passed into the superior extremity of the colon, which should be knotted over it by a purse-string stitch, and afterwards fixed by a perforating stitch. The lower extremity should be seized by the jaws of the opened clamp and drawn to the anus, directly the two ends of the colon are in contact, they should be joined by five or six sero-serous stitches, and the tube again drawn to the anus An invagination results, and on it the operator should insert some new sero-serous stitches The tube falls out by itself at the end of eight to ten days

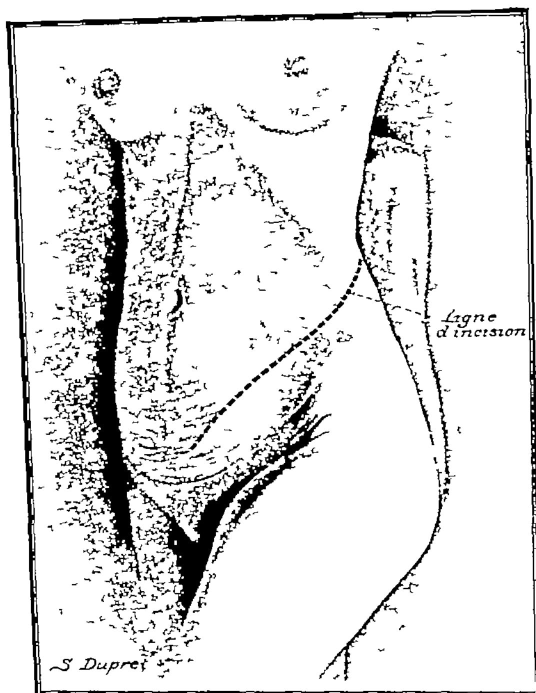


FIG 69.—CANCER OF THE LEFT COLON COLECTOMY

Oblique incision, starting from the inferior angle of the last rib, and reaching the middle line 4 centimetres above the pubis; this is the same incision as for exposure of the pelvic ureter The patient is laid on her back, turned to the side (partly on her back and partly on her side), and raised by a cushion.

Ligne d'incision—Line of incision.

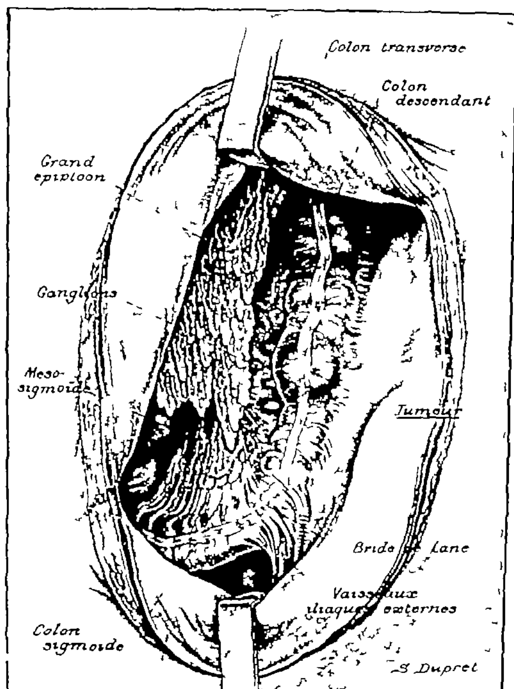


FIG 70.—CANCER OF THE LEFT COLON COLECTOMY

The reader should note the extensive space given by the preceding incision. Note the Lane's band, which is found not only in all cases of cancer of the bowel, but in a great number of general pathological conditions. "This Pandora's box from whence so many evils arise" (Arbuthnot Lane)

Côlon transverse = Transverse colon *Côlon descendant* = Descending colon *Grand épiploon* = Great omentum *Ganglions* = Glands *Méso-sigmoïde* = Meso-sigmoid *Tumeur* = Tumour *Br de de Lane* = Lan s band *Vaisseaux iliaques externes* = External iliac vessels *Côlon sigmoïde* = Sigmoid colon

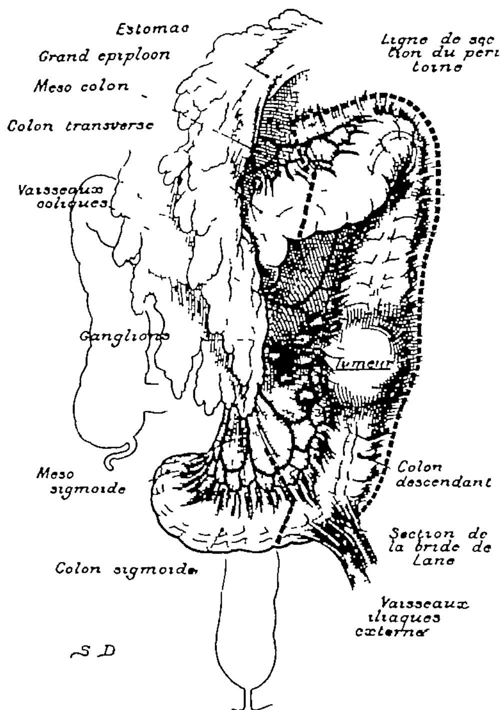


FIG 71 —CANCER OF THE LEFT COLON COLECTOMY

The dotted line shows the limits of the excision.

Estomac=Stomach *Ligne de section du péritoine*=Line of division of the peritoneum *Grand épiploon*=Great omentum *Méso-côlon*=Meso-colon *Côlon transverse*=Transverse colon *Vaisseaux côliques*=Vessels of the colon *Ganglions*=Glands *Tumeur*=Tumour *Côlon descendant*=Descending colon. *Méso-sigmoide*=Meso-sigmoid *Section de la bride de Lane*=Division of Lane's band. *Côlon sigmoide*=Sigmoid colon *Vaisseaux iliaques externes*=External iliac vessels.

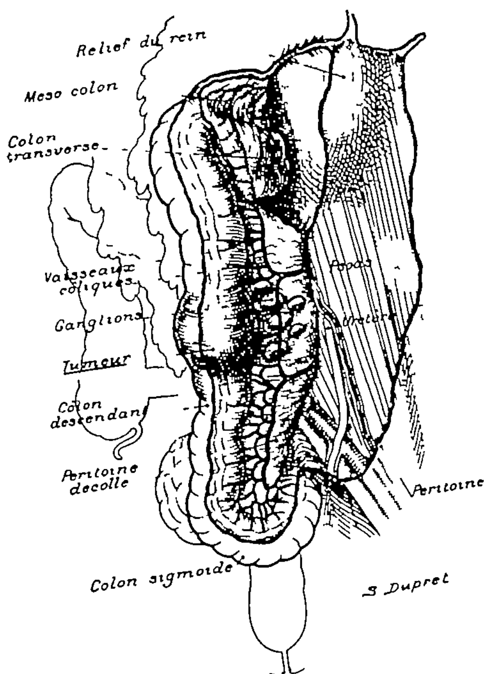


FIG 72 —CANCER OF THE LEFT COLON COLECTOMY

Appearance of the organs after the descending colon, the outer quarter of the colon, and the splenic flexure have been liberated.

Rel ef du rein=Outline of the kidney *Méso-côlon*=Meso-colon *Côlon* Transverse colon *Vaisseaux côliques*=Vessels of the colon *Côlon* *Ganglions*=Glands *Uretère*=Ureter *Tumeur*=Tumour *Péritoine* Descending colon *Péritoine décollé*=The peritoneum stripped *Côlon sigmoïde*=Sigmoid colon

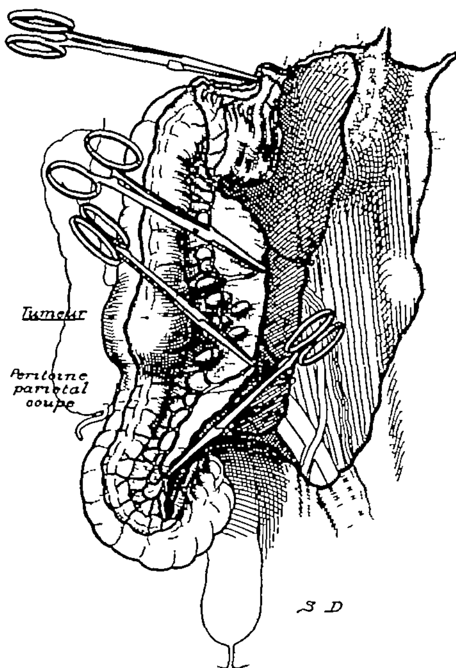


FIG 73 —CANCER OF THE LEFT COLON COLECTOMY

Appearance of the left colon and of its meso-colon after division of the meso-colic vessels.

Tumeur = Tumour *Péritoine pariétal coupé* = Parietal layer of the peritoneum cut.

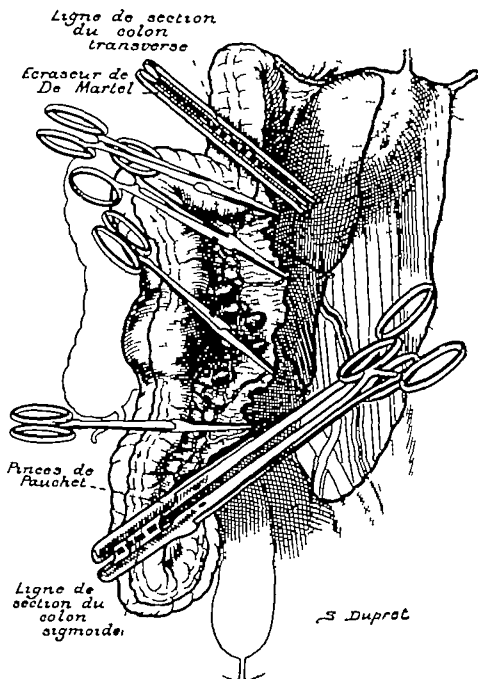


Fig 74 —Cancer of the Left Colon Colectomy

Crushing the two ends of the colon. Below the division is made at the end of the descending colon and of the sigmoid; above, at the outer quarter of the transverse colon. Note the division is made obliquely Above Th. de Martel's écraseur and below two duodenal forceps

Ligne de section du côlon transverse—Line of division of the transverse colon *Ecraseur de De Martel*—De Martel's écraseur *Pinces de Pauchet*—Pauchet's forceps *Ligne de section du côlon sigmoïde*—Line of division of the sigmoid colon

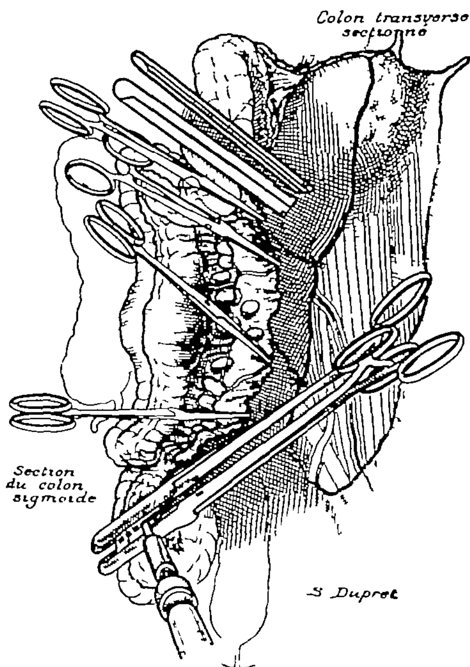


FIG 75.—CANCER OF THE LEFT COLON COLECTOMY

Division of the colon with the thermo-cautery

Côlon transverse sectionné=Transverse colon divided. *Section du côlon sigmoïde*=Division of the sigmoid colon

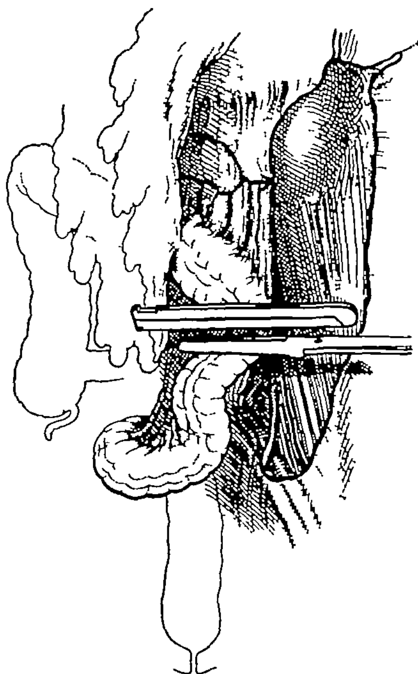


FIG. 77 —CANCER OF THE LEFT COLON COLECTOMY

The sigmoid is brought into contact with the transverse colon. The liberation has been sufficient for end-to-end anastomosis to be possible; it should not be performed when the disproportion between the calibre of the transverse colon and the sigmoid is too great. In this figure it was not very pronounced. In the patient who has served as a model for the drawings, the transverse colon was distended owing to chronic obstruction: the sigmoid colon was normal.

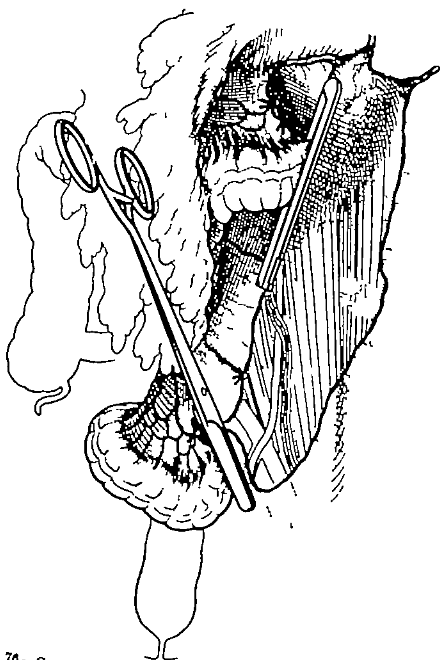


FIG 76.—CANCER OF THE LEFT COLON COLECTOMY
Resection is completed.

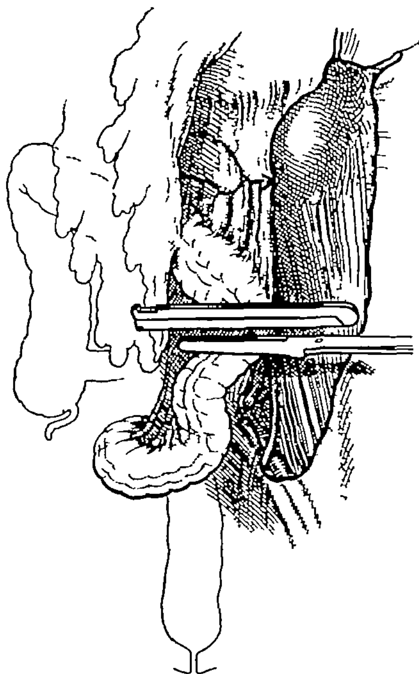


FIG 77.—CANCER OF THE LEFT COLON COLECTOMY

The sigmoid is brought into contact with the transverse colon. The liberation has been sufficient for end-to-end anastomosis to be possible; it should not be performed when the disproportion between the calibre of the transverse colon and the sigmoid is too great. In this figure it was not very pronounced. In the patient who has served as a model for the drawings, the transverse colon was distended owing to chronic obstruction the sigmoid colon was normal.

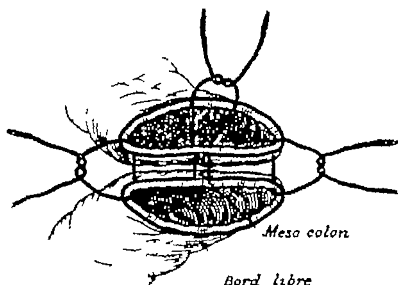


FIG 78.—CANCER OF THE LEFT COLON COLECTOMY

End to-end suture is finished. The two ends of the colon are nearly of the same size. Even if the difference be between 2 and 3 centimetres, this anastomosis is to be recommended. This difference can exist even when there is no chronic obstruction. The suture is begun by applying the insertions of the meso-colon to each other and fixing them by a stitch in U near the intestinal loop. Two ordinary stitches at the commissures mark out the line of apposition.

Méso-côlon = Meso-colon. *Bord libre* = Free border

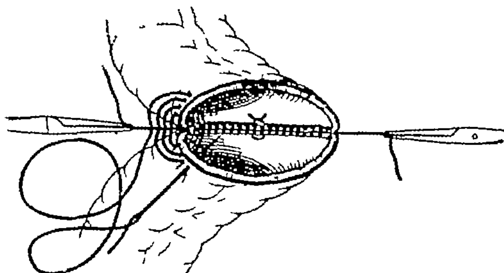


FIG 79.—CANCER OF THE LEFT COLON COLECTOMY

Posterior through-and through button hole stitch The anterior is formed by a continuous suture which invaginates the mucosa Note the direction of the needle, which first pierces the mucosa from within outwards, then enters the intestinal cavity from without inwards In this way the sutured border is prominent within the intestinal cavity and not on the outside.

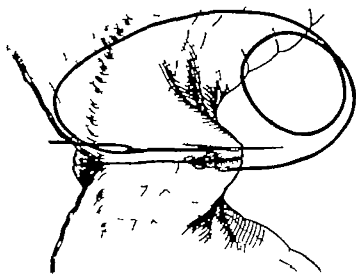


FIG 90.—CANCER OF THE LEFT COLON COLECTOMY

Sero-serous continuous suture Cushing's stitch. When the suture is finished, it is invisible. The same level of suture is continued behind.

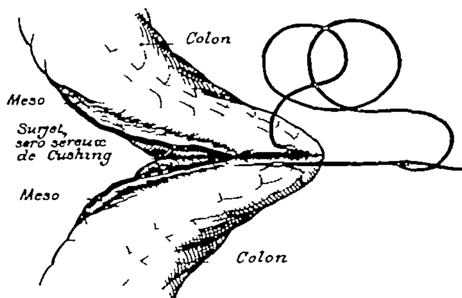


FIG 91.—CANCER OF THE LEFT COLON COLECTOMY

How the intestine is twisted in order to make the same stitch behind as in front

Côlon = Colon *Méso* = Meso-colon *Surjet séro-séreux de Cushing* = Sero-serous continuous suture with Cushing's stitch

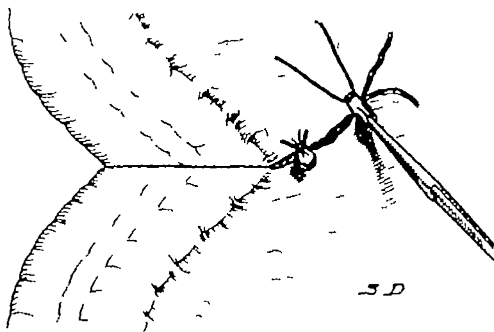


FIG 82.—CANCER OF THE LEFT COLON COLECTOMY

When the sero-serous suture is finished (Cushing's invisible stitch) the meso-colon must be closed. The way indicated is better than using the needle; it avoids perforation of a vessel especially if the mesentery be fat. Note the oblique division of the two intestines in contact with each other. Every suture of the colon should be made in this way

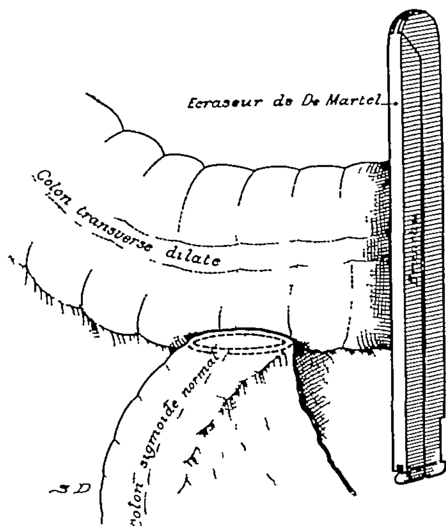


FIG 83.—CANCER OF THE LEFT COLON COLECTOMY

Implantation of the sigmoid into the dilated transverse colon. Owing to chronic obstruction, the transverse was nearly three times the diameter of the normal colon. End to-end suture was impossible and dangerous. Implantation was performed 7 or 8 centi metres from the crushed part.

Écraseur de De Martel=De Martel s écraseur *Côlon transverse dilaté*=Dilated transverse colon *Côlon sigmoïde normal*=Normal sigmoid colon.

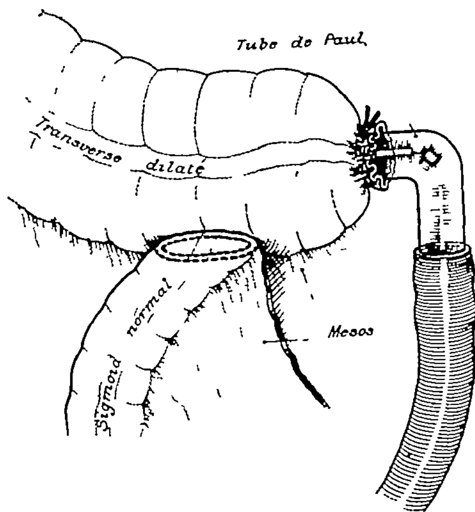


FIG 84 —CANCER OF THE LEFT COLON COLECTOMY

Implantation of the sigmoid into the transverse colon. Note the oblique division of the colon.

Tube de Paul=Paul s tube *Transverse dilaté*=Dilated transverse colon *Sigmoide normal*=Normal sigmoid colon *Mésos*=Meso-colons

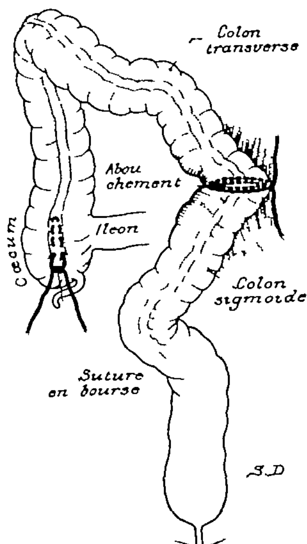


FIG 85.—CANCER OF THE LEFT COLON COLECTOMY

End to-end suture is finished. Preparation is made for a cæcostomy Do not perform colectomy followed by end to-end anastomosis without making at the same time a counter anus in the cæcum. The best suture of the large intestine is never absolutely secure.

Côlon transverse = Transverse colon *Abouchement* = Anastomosis *Iléon* = Ileum *Cæcum* = Cæcum. *Côlon sigmoïde* = Sigmoid colon. *Suture en bourse* = Purse-string stitch.

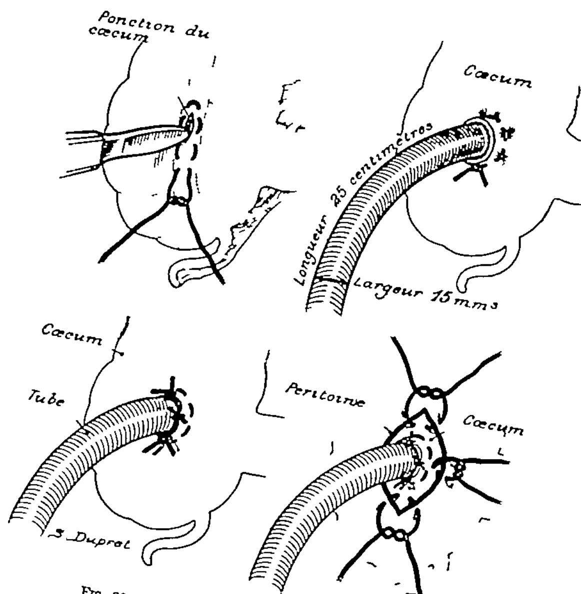


FIG 86.—CANCER OF THE LEFT COLON COLECTOMY

Cæcostomy advisable after every colectomy especially of the transverse colon.

Ponction du cæcum = Puncture of the cæcum *Cæcum* = Cæcum *Longueur 25 centimètres* = 25 centimetres long *Largeur 15 mms* = 15 millimetres broad *Tube* = Tube *Péritoine* = Peritoneum

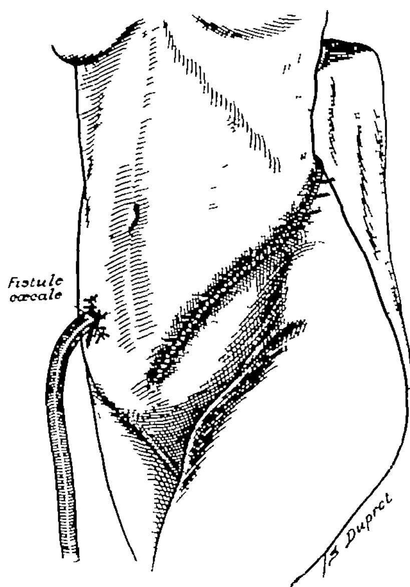


Fig 87.—Cancer of the Left Colon Colectomy
Appearance after completion of end to-end anastomosis.

Fistule cæcale=Cæcal fistula.

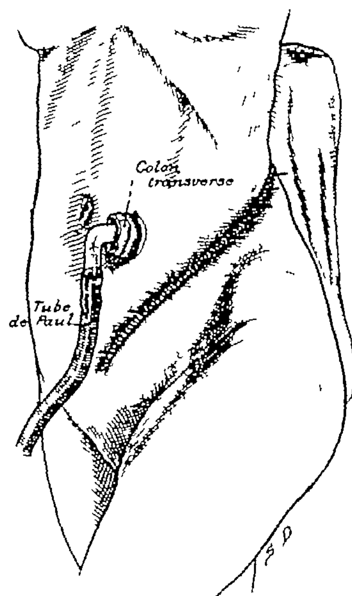


Fig 88.—Cancer of the Left Colon Colectomy
Completion of the implantation of the sigmoid into the transverse colon

Côlon transverse = Transverse colon *Tube de Paul* = Paul's tube

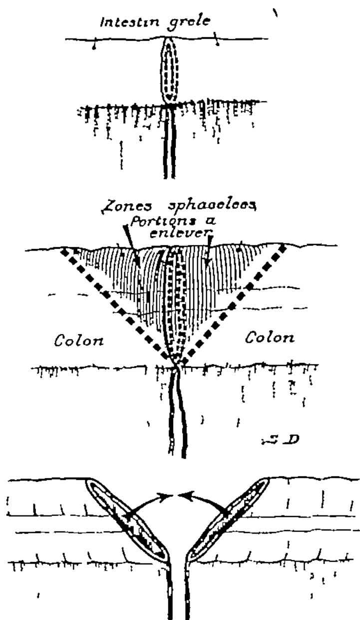
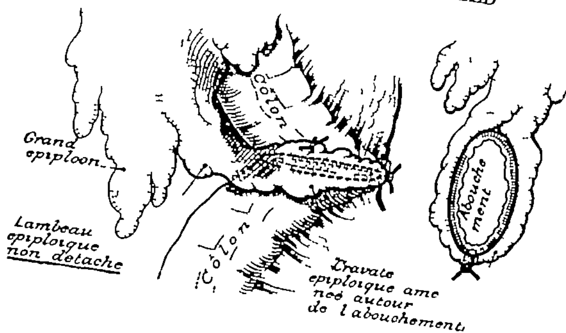


FIG 89 —CANCER OF THE LEFT COLON COLECTOMY (LOCKHART MUMMERY'S METHOD)

Comparison of the end to-end sutures of the small intestine and of the colon. The small intestine is well nourished and there is no risk of disunion. The divisions in the intestine must be oblique like a "whistle" because the free border is not so well supplied as the mesenteric border Most of the accidents after colorrhaphy are due to sloughing of the wall

Intestin grêle=Small intestine *Zônes sphacélées*=Sloughing areas *Portions à enlever*=Parts to be removed. *Côlon*=Colon



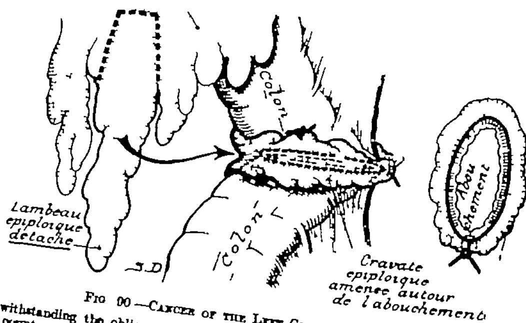


Fig 00.—Cancer of the Left Colon Colectomy

Notwithstanding the oblique suture, the carefully made sutures at two levels, and the counter anus with colectomy the operator should, if possible make an omental graft. The best suture of the colon is not absolutely secure, and that is the reason for these technical details, which, if not indispensable are at least useful.

Colon = Colon *Grand épiploon* = Great omentum *Abouchement* = Anastomosis *Lambeau épiploïque non détaché* = Omental flap, not separated. *Cravate épiploïque amenée autour de l abouchement* = Omental cravate brought round the anastomosis *Lambeau épiploïque détaché* = Omental flap separated

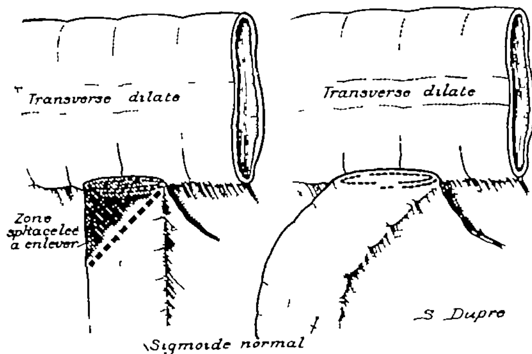


FIG 91 —CANCER OF THE LEFT COLON COLECTOMY

How the colon is divided in the form of a whistle before making an end to-end anastomosis and even implantation. (Lardennois' method.)

Transverse dilaté = Dilated transverse colon *Zône sphacélée à enlever* = Sloughing area to be removed. *Sigmoïde normal* = Normal sigmoid.

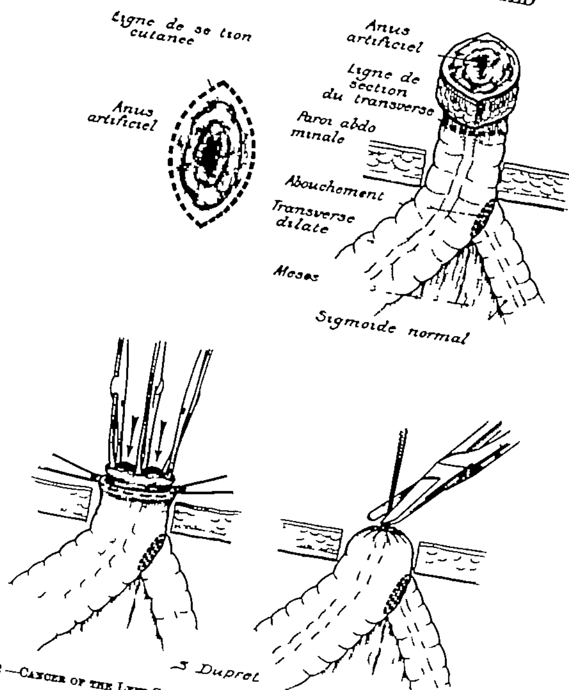


FIG 92 —CANCER OF THE LEFT COLON COLECTOMY (CURE OF THE ANUS OF THE TRANSVERSE COLON)

The different stages in the cure of the anus of the transverse colon. Six weeks after the operation the operator excises the anus and buries it. No local anesthesia is required. There is no risk to the patient, whilst, when the two extremities are agglutinated, the opening is extremely difficult to repair

Anus artificiel = Artificial anus *Ligne de section cutanée* = Line of cutaneous incision *Ligne de section du transverse* = Line of division of the transverse colon *Paroi abdominale* = Abdominal wall *Abouchement* = Anastomosis *Transverse dilaté* = Dilated transverse colon *Mésos* = Meso-colons *Sigmoïde normal* = Normal sigmoid.

VIII

SIGMOIDECTOMY WITH A PERMANENT ANUS

RESECTION of the sigmoid ought usually to be completed by end-to-end anastomosis of the two extremities of the colon The technique is easy when the sigmoid is long and when the upper part is resected. But when the lesion has its site in the middle or lower part, the continuity of the digestive tract must be re-established, either by the extremity of the descending colon being brought down into the rectum over a rubber tube, or by being fixed round the anus. In the first case the rectum is preserved, in the second, it is previously removed, whilst the sphincter ani is retained (Vol V)

The latter operation is serious the first slight, it is a mild procedure which consists in opening the upper extremity of the colon into the iliac wall and making a terminal anus, as after an abdomino-perineal excision of the rectum (Hartmann) But what, then, is to be done with the recto-sigmoidal end ?

Either close it in a cul-de-sac (Hartmann, Lockhart-Mummery) as the vagina after hysterectomy or leave it open, disinfect its cavity with ether and iodine, and then introduce a drainage tube and gauze as into a vagina after complete hysterectomy (Pauchet) We have done this on three occasions

The following figures illustrate this operation The case was one of tuberculosis of the sigmoid which we had taken for cancer We removed the adnexa, the uterus, and the sigmoid The vagina and rectum remained open Cure took place in four weeks Strips of gauze introduced by the pelvis were removed by the vagina A layer of omentum was stretched out above the pelvic orifice, and two Carrel's tubes were fixed above the pubis By means of these tubes, antiseptic solution was injected four or five days after the operation to render removal of the gauze easy

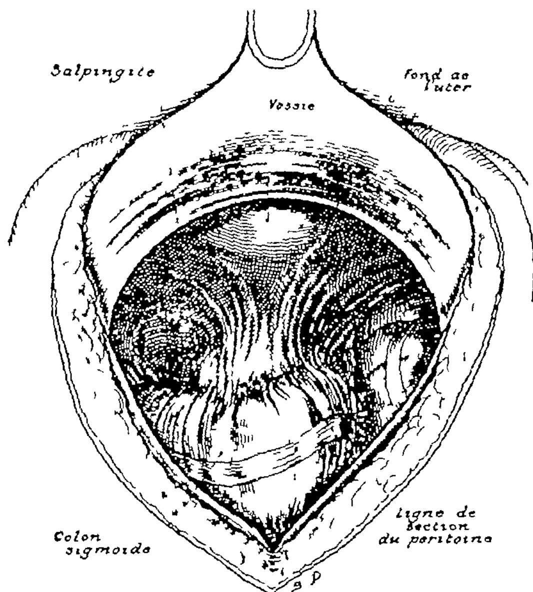


Fig. 93.—Tuberculosis of the Sigmoid Secondary to a Tuberculous Salpingitis.

Median laparotomy. The operator perceives the sigmoid spread over the pocket of the salpingitis and behind the bladder; the prominence is formed by the pocket of the salpingitis, which is very hard. The uterus is not seen.

Salpingite=Salpingitis. *Fond de l'utérus*=Fundus uteri. *Vessie*=Bladder. *Colon sigmoïde*=Sigmoid colon. *Ligne de section du péritoine*=Line of division of the peritoneum.

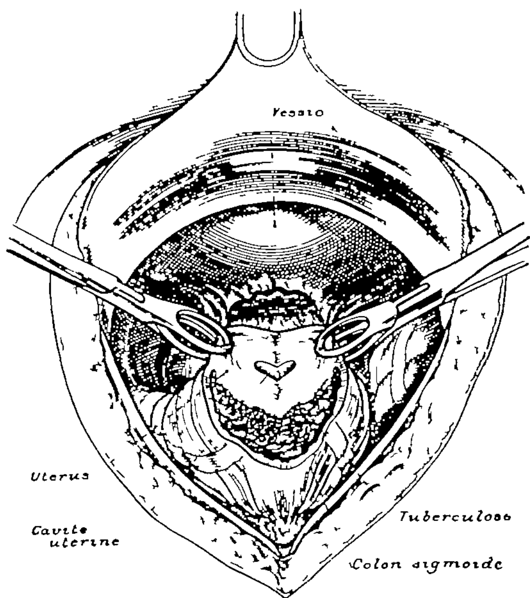


FIG 94 —TUBERCULOSIS OF THE SIGMOID SECONDARY TO A TUBERCULOUS SALPINGITIS.

To reach the uterus the operator performs a hemi-section (J L. Faure) whilst doing this, he sees the posterior wall of the uterus has taken the place of the anterior wall of the sigmoid, which is destroyed. The intestine communicates with the tube (tubercular pyosalpingitis) The massive tuberculosis of the sigmoid led to the belief in the presence of cancer The microscope allowed of a correct diagnosis.

Vessie = Bladder *Utérus* = Uterus *Tuberculose* = Tuberculosis *Cavité utérine* = Uterine cavity *Côlon sigmoïde* = Sigmoid colon

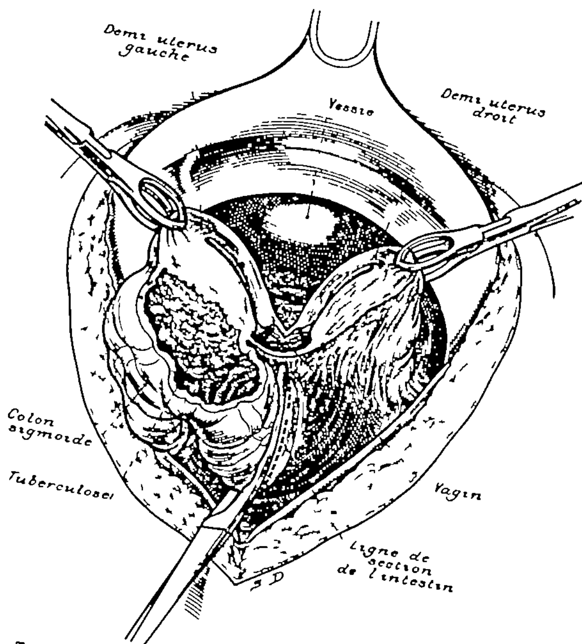


FIG 93.—TUBERCULOSIS OF THE SIGMOID SECONDARY TO A TUBERCULOUS SALPINGITIS.

The uterus is divided; the operator sees the intestinal cavity which communicates with the cavity of the salpingitis and led to the belief in the presence of a neoplasm. Removal of the uterus was decided upon. The uterus, the tubes, and the intestine were resected *en bloc*

Demi uterus gauche = Left half of the uterus *Demi uterus droit* = Right half of the uterus *Vessie* = Bladder *Colon sigmoide* = Sigmoid colon *Vagin* = Vagina *Tuberculose* = Tuberculosis *Ligne de section de l'intestin* = Line of the intestinal incision

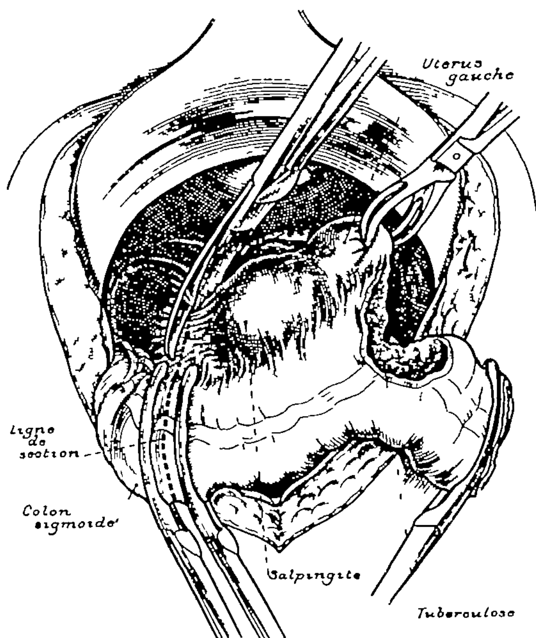


FIG 96.—TUBERCULOSIS OF THE SIGMOID SECONDARY TO A TUBERCULOUS SALPINGITIS.
Removal of the adnexa and division of the upper part of the sigmoid.

Utérus gauche—Left side of the uterus *Ligne de section*—Line of incision *Côlon sigmoïde*—Sigmoid colon *Salpingite*—Salpingitis *Tuberculose*—Tuberculosis.

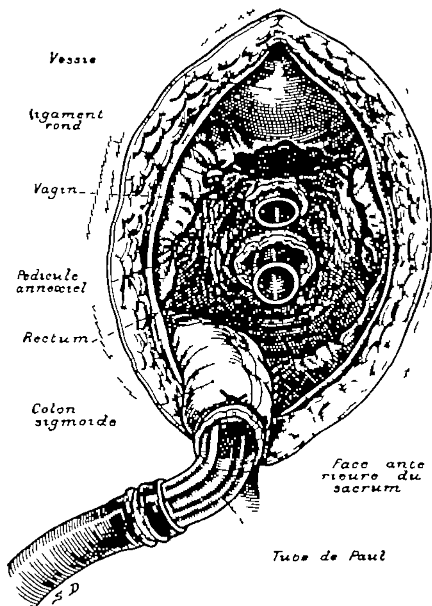


FIG 97—TUBERCULOSIS OF THE SIGMOID SECONDARY TO A TUBERCULOUS SALPINGITIS.

The general state of the patient and the existence of an extensive raw surface prevented all idea of establishing continuity of the intestine a temporary artificial anus was made. Afterwards, the establishment of communication between the rectum and the intestine was necessary either by lowering the colon or by the interposition of a loop of small intestine.

Vessie—Bladder *Ligament rond*—Round ligament *Vagin*—Vagina *Pédicule an exiel*—Pedicle of the adnexa *Rectum*—Rectum *Côlon sigmoïde*—Sigmoid colon *Face antérieure du sacrum*—Anterior surface of the sacrum *Tube de Paul*—Paul s tube

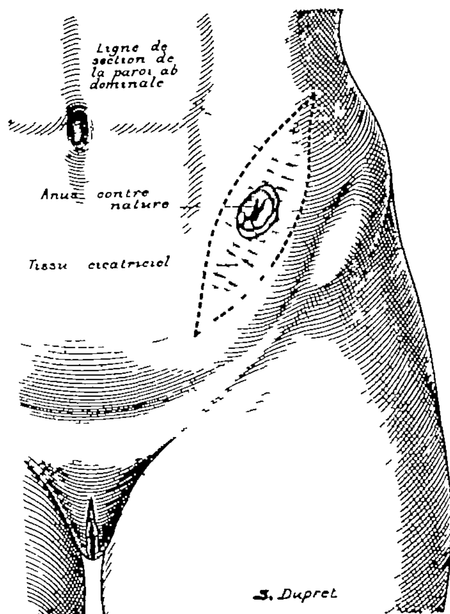


FIG 98.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE).

Resection of the sigmoid has been made three months before Lowering the descending colon to the anus. Re-establishment of continuity between the colon and the rectum.

Ligne de section de la paroi abdominale=Line of incision of the abdominal wall. *Anus contre nature*=Artificial anus *Tissu cicatriciel*=Cicatricial tissue

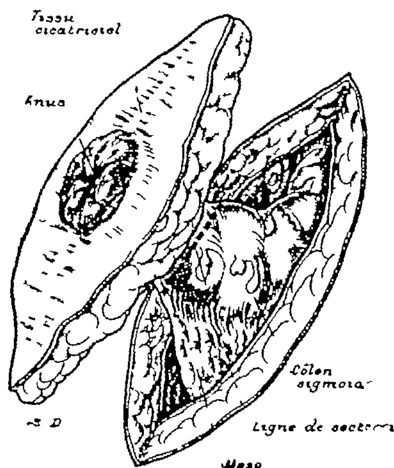


Fig 99.—Sigmoidectomy in Two Stages (Second Stage).

Excision of a lozenge-shaped piece of the skin and of the old cicatrix surrounding the anus at the end of the colon. The dotted line on the descending colon shows the part to be fixed to the perineum.

Tissu cicatriciel = Cicatricial tissue *Anus* = Anus *Côlon sigmoïde* = Sigmoid colon *Ligne de section* = Line of incision *Méso* = Meso-colon

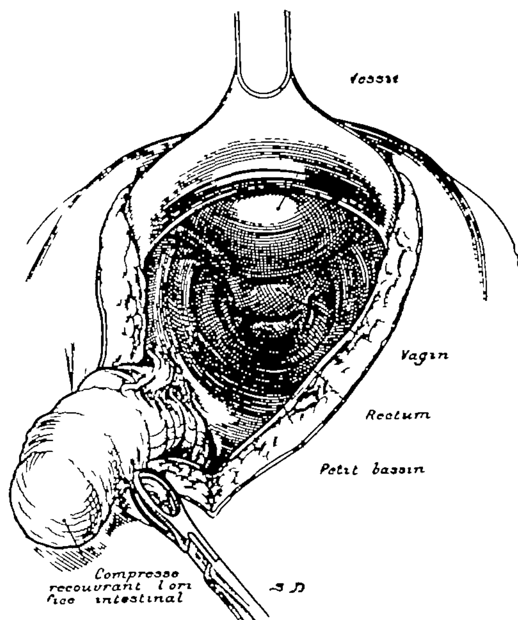


FIG 100.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE).
The end of the colon capped by a piece of gauze has been brought through the median incision. Note behind the bladder the superior fornix of the vagina and the upper cul-de-sac of the rectum and anus.

Vessie = Bladder *Vagin* = Vagina *Rectum* = Rectum *Petit bassin* = Small pelvis. *Compresse recouvrant l'orifice intestinal* = Compress covering the intestinal opening

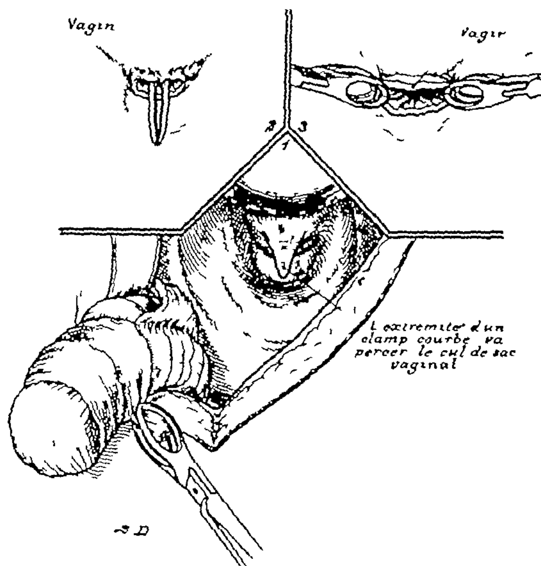


FIG 101 — SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE).

An assistant introduces a clamp into the vagina, which is made to bulge. The knife opens the vagina; the clamp passes into the abdomen. The vagina is opened and held so by two tissue forceps.

Vagin = Vagina. *L extrémité d'un clamp courbe va percer le cul-de-sac vaginal* = The end of a curved clamp to pierce the vaginal cul-de-sac

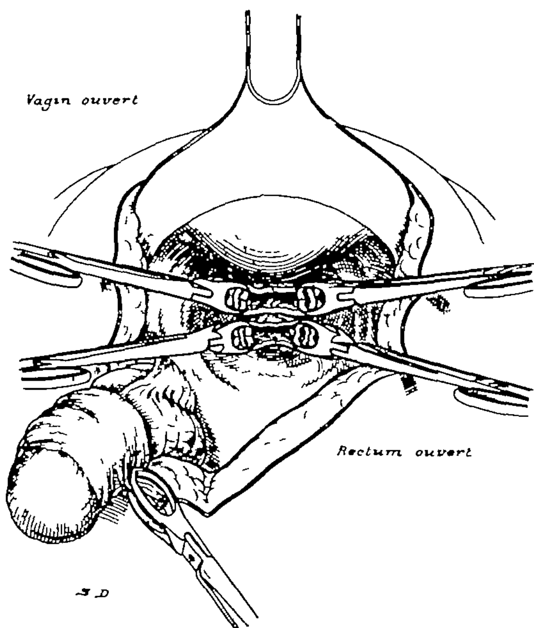


FIG. 102.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE).
The vagina and the rectum opened in the same way are kept gaping by these forceps.

Vagin ouvert=Vagina opened. *Rectum ouvert*=Rectum opened.

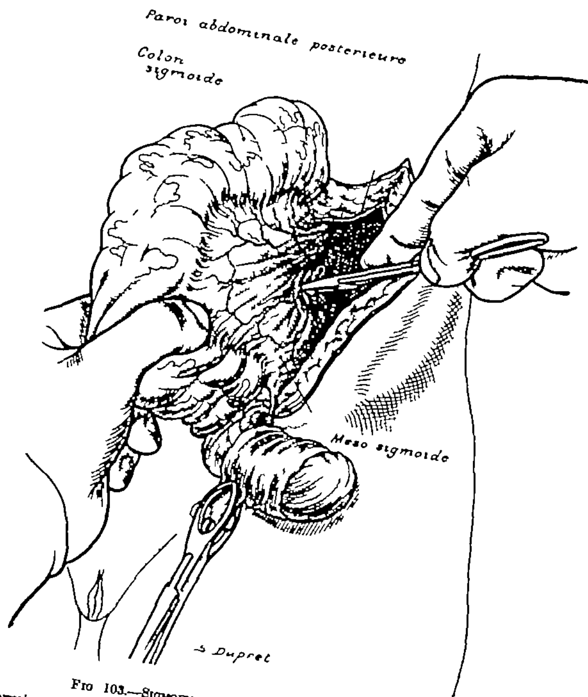


Fig 103.—Sigmoidectomy in Two Stages (Second Stage). Lowering the descending colon. This is done by separating the colon from the parietal peritoneum The inferior sigmoid artery is a hindrance and must be cut. The operator preserves the marginal artery to supply the terminal part

Paroi abdominale postérieure = Posterior abdominal wall *Côlon sigmoïde* = Sigmoid colon *Méso-sigmoïde* = Meso-sigmoid

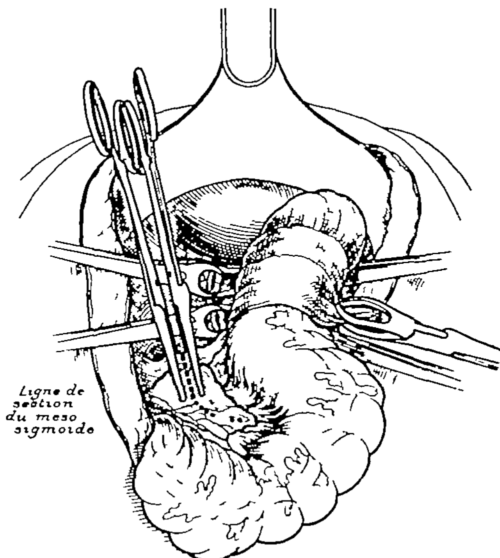


FIG 104 —SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE)
Division of a sigmoid artery which allows the segment of the colon to be brought down

Ligne de section du méso-sigmoïde = Line of division of the meso-sigmoid

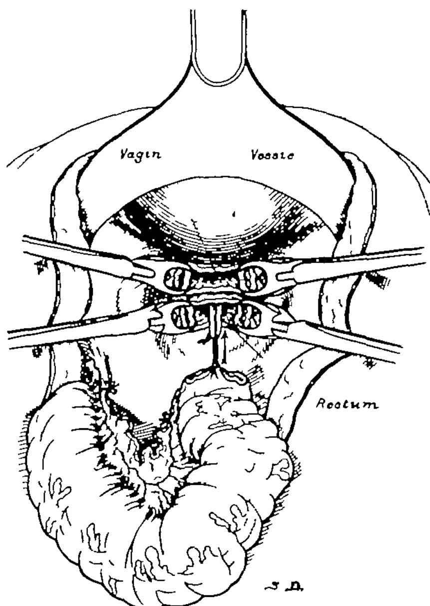


FIG 105.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE)

The division of the meso-colon produces mobility of the part of the colon without any change in its nutrition. The operator ought to be certain of the vascular supply of the terminal border in order to be assured the intestinal end is well supplied. A clamp introduced into the anus draws the extremity of the colon into the end of the rectum.

Vagin=Vagina. *Vessie*=Bladder *Rectum*=Rectum

FIG 106.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE)

The colon has been brought into the end of the rectum and fixed by stitches; the pelvis has been rubbed with ether The vagina serves for drainage.

Drain et mèche=Drainage tube and gauze *Vessie*=Bladder *Vagin*=Vagina. *Rectum*=Rectum. *Côlon sigmoïde*=Sigmoid colon

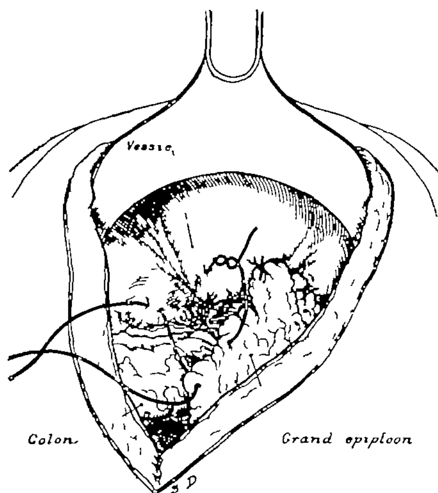


FIG 107 —SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE)

The operator fixes the great omentum to the bladder to assure continency of the suture of the colon to the rectum.

Vessie=Bladder *Grand épiploon*=Great omentum. *Côlon*=Colon

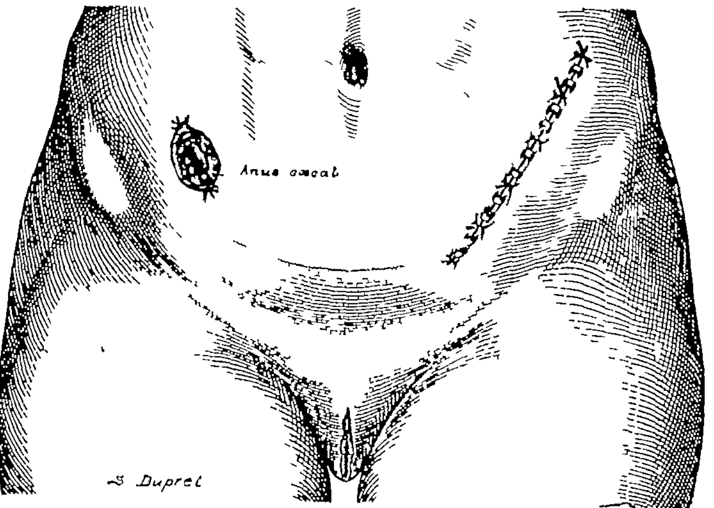


FIG 108.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE)
The operation is finished. The operator has made a cæcal anus to be certain the discharges are diverted for some weeks
Anus cæcal—Cæcal anus

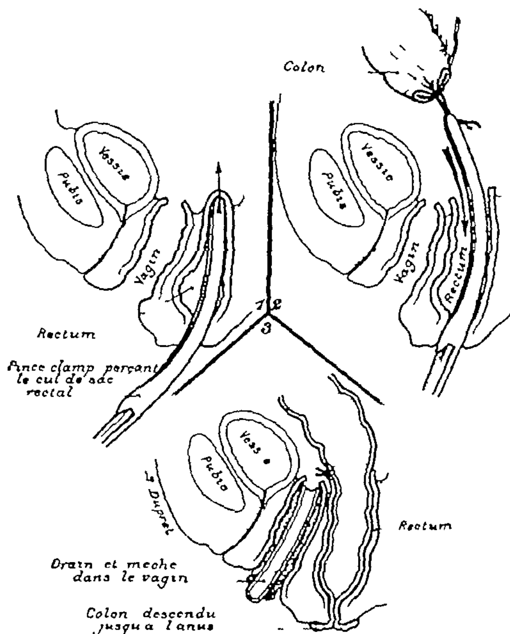


FIG 100.—SIGMOIDECTOMY IN TWO STAGES (SECOND STAGE).

Drawing showing some details of the preceding operation.

Côlon = Colon *Vessie* = Bladder *Pubis* = Pubis *Vagin* = Vagina *Rectum* = Rectum *Pince-clamp perçant le cul-de-sac rectal* = Clamp piercing the rectal cul-de-sac *Drain et mèche dans le vagin* = Drainage tube and gauze in the vagina. *Côlon descendu jusqu'à l'anus* = Colon brought down to the anus

IX

CHRONIC INTESTINAL STASIS

Different Surgical Methods of Treatment.

'E shall not speak of the pathogeny of the affection, which is escribed in Vol. I, neither does the etiology concern us at the present me, the important thing is to base our opinion on the practical .cts already obtained, without losing ourselves uselessly in hypoeses.

We know the following regarding chronic intestinal stasis

1 Its extreme frequency

2 Its morbid influence on a great number of chronic diseases

3 The means of recognising it

4 The means of curing it

The condition should be called the Great Disease, because autoitoxication of intestinal origin and syphilis are certainly the most requent causes of our chronic affections

What is arthritism but the result of chronic intestinal stasis ? To vhat are due megrim general depression of spirits atonic dyspepsia, he majority of cutaneous affections, chronic rheumatism, and arterioclerosis ? To chronic intestinal stasis What is the cause of diopathic epilepsy and of numerous psychoses ? Chronic intestinal tasis

The recent works of the American surgeon Cotton show the nfluence of this condition on mental affections

In December, 1923 we met again Sir Arbuthnot Lane in London with some of his collaborators, especially Robertson, who has studied chronic intestinal stasis in a number of epileptics who had been operated upon after intervention on the bowel, the attacks had disappeared in nearly all the cases

What is the cause of puerperal eclampsia, of gravid pyelitis, of coli bacilluria, of a great number of cases of diabetes and of Bright's disease, of exophthalmic and of endemic goitre ? Usually chronic intestinal stasis To what, if not to chronic intestinal stasis are chronic mammitis fibro-cystic ovaries the majority of cases of

chronic appendicitis, and pancreatis due ? What is the primary cause of the majority of cases of tuberculosis and of cancer ? Chronic intestinal stasis

The majority of cases of tuberculosis suffer also from intestinal stasis, and the same applies to cancer, and we wish to insist on the close connection existing between stercoræmia and cancer of the breast, of the ovary, of the intestine, of the stomach, of the pancreas and of the biliary passages The condition appears to have no influence on cancer of the lip, of the tongue, and of the mouth, which is due to local irritation, as tobacco and syphilis, uterine cancer often follows metritis or lacerations of the cervix during accouchement. We can, then, say that syphilis and chronic intestinal stasis are at the bottom of most chronic diseases

How can Chronic Intestinal Stasis be Recognised ?—By the X rays This appears very simple, but nothing is more difficult to obtain from radiologists than useful radiograms, one or two are not sufficient, a series of four, five, or six, showing the passage of food through the intestine for a space of twelve hours, are required. Three-quarters of the radiograms submitted to us are useless, if there be not a trained radiologist at command, we tell our confrères to get the patient to swallow three teaspoonfuls of charcoal, and note the time it appears in the stools This should normally occur in twenty four hours, if it be later, the passage of food is delayed This is a less scientific method and less exact than good radiograms, but better than bad ones

What Treatment should be adopted for Chronic Intestinal Stasis ?—For a long time our colleagues have considered that the only treatment proposed by Sir Arbuthnot Lane and myself was complete colectomy Operative treatment has been discredited by many medical men the majority of whom advise anything to these surgical cases except an operation

This is unfortunate, for if there be a chapter in pathology where the surgeon has triumphed, it is that of chronic intestinal stasis There is no question relating to pathology where surgery can borrow more from medicine or at least where it can better lend its aid because in the treatment of chronic intestinal stasis perfect agreement between the medical man and the surgeon should be reached (for medical treatment see Vol I) The surgical treatment consists of colotysis short-circuit or partial or complete colectomy (see

To sum up (1) The number of cases of chronic intestinal stasis is great

(2) The consequences of this disease are disastrous to the health

(3) Surgery is a powerful and a mild remedy

(4) Before thinking of short-circuit, or colectomy, in most cases choose cololysis, a mild and very often efficacious operation.

(5) Physical, medical, and psychical treatment should be adopted before and after operation in all operable cases, and also in inoperable ones

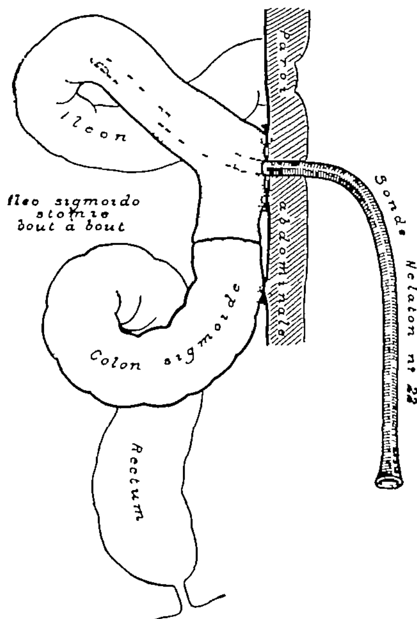


FIG 110 —COMPLETE COLECTOMY IN ONE STAGE FOR CHRONIC INTESTINAL STASIS: DEVIATION OF THE DISCHARGES.

After complete colectomy either obstruction may occur at the anastomosis or the suture may become separated. The best technique does not prevent this latter complication with certainty In order to guard against it, the two following points have always appeared to us to be efficacious; on the one hand, fixation of the anus to the abdominal wall by some stitches, and on the other the formation of a counter anus above the anastomosis, for eight days. The removal of Nélaton's catheter does not produce a fistula; obliteration occurs spontaneously The stitches which fix the anastomosis to the abdominal wall prevent disunion, but if it should be produced, make it free of danger If, for some reason or other the production of a kink in the loop at the anastomosis is to be feared later it is easy to separate it from the wall by a knife under local anæsthesia.

Iléon=Ileum *Iléo sigmoïdostomie bout-à-bout*=End to-end ileo-sigmoidostomy *Sonde Nélaton No 22*=Nélaton's catheter No 22 *Côlon sigmoïde*=Sigmoid colon *Paroi abdominale*=Abdominal wall. *Rectum*=Rectum

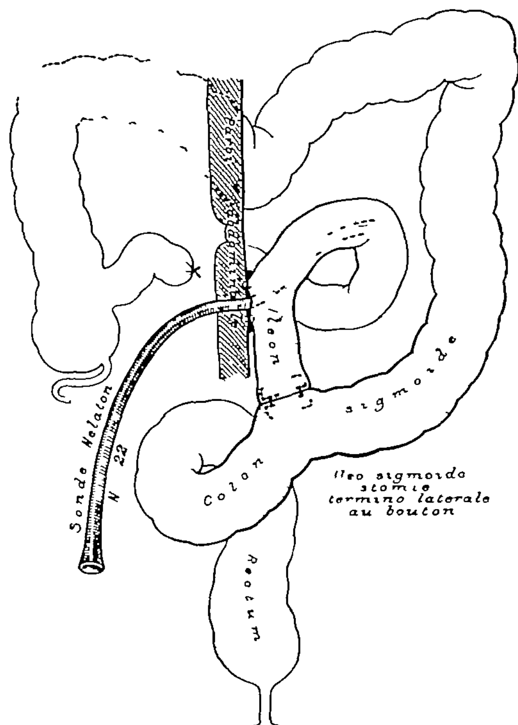


FIG 111 —ILEO-SIGMOIDOSTOMY (SHORT CIRCUIT) FOR CHRONIC INTESTINAL STASIS: DEVIATION OF THE DISCHARGES.

The operation being finished and made here with a button, the operator punctures the intestine and introduces a Nélaton's catheter the loop is fixed by two stitches to the abdominal wall. The catheter remains in position for eight days it should then be removed and will not leave a fistula. The button falls out in about ten days. This counter-anus prevents intestinal obstruction, which is always possible.

Paroi abdominale = Abdominal wall. *Iléon* = Ileum *Sonde Nélaton No 22* = Nélaton's catheter No 22 *Côlon sigmoïde* = Sigmoid colon *Iléo-sigmoïdostomie termino-latérale au bouton* = End-side ileo-sigmoidostomy with a button *Rectum* = Rectum

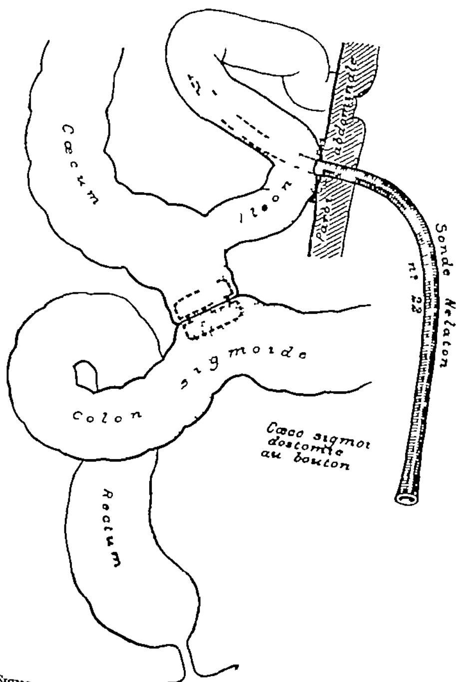


FIG 112 —CÆCO-SIGMOIDOSTOMY (SHORT-CIRCUIT) FOR CHRONIC INTESTINAL STASIS: DEVIATION OF THE DISCHARGES

A cæco-sigmoidostomy has been made with a button. It is sometimes useful to insert a catheter to remove the discharges, as in ileo-sigmoidostomy. The risks of acute intestinal obstruction after the former are less than after the latter; but in certain conditions they do exist

Cæcum = Cæcum *Iléon* = Ileum *Paroi abdominale* = Abdominal wall. *Sonde Nélaton No 22* — Nélaton's catheter No 22 *Côlon sigmoïde* = Sigmoid colon *Cæco-sigmoidostomie au bouton* = Cæco-sigmoidostomy with a button *Rectum* = Rectum

X

ANAL FISTULÆ

LIKE numbers of my colleagues I formerly neglected this chapter in surgical practice. I considered it without interest To introduce a director into the fistulous canal to cut the tissues over the groove of the director, to excise the canal, and then to suture the wound or to allow it to granulate, according as there were or there were not risks of infection—such was the simple notion which prompted me. But some bad results made me reflect, some patients recovered badly many operations were necessary some ani suppurated for months or for years and some were malformed and functionated badly, some were partially or entirely incontinent, in two cases pulmonary tuberculosis occurred some months after a simple division of the fistula, finally I noticed many cases of psychasthenia, or of neurasthenia, in patients obsessed by their anus, in spite of operations, of care, and of encouragement

During a visit to London I saw Lockhart-Mummery perform a series of operations for fistula St Mark's Hospital is the centre where operation on most of the cases of anal fistula is performed, a third of the hospital cases suffering from this disease I noticed the majority of the neurasthenics had reason to complain, their condition was not enviable as the results were imperfect owing to a badly performed operation or to want of care Lockhart-Mummery gave me the benefit of his long experience, and performed many operations on the anus in my presence, and enlightened me on the treatment of fistula in ano I describe here a summary of my observations and of my knowledge obtained from him Our distinguished London colleague is the most skilled surgeon in this condition.

The Cure of Fistula in Ano often requires a Delicate and Special Technique —The fistula may be *complete* it extends from a cutaneous external opening to an internal orifice within the rectum. It is *incomplete* when it ends in a cul-de-sac, either in the skin (blind internal fistula) or in the rectum (blind external fistula)

When the track passes above the sphincter, it is said to be *supra sphincteric*, and the very important question of cutting the sphincter presents itself If, on the contrary, it passes below the muscle, there is no question of dividing the sphincter, this *sub-sphincteric* form is the most frequent

It is not always easy to recognise whether the site be above or below the sphincter The surgeon thinks the grooved director introduced into the track hits on the external sphincter, this is often *not the case*, the inflamed tissues deceive the finger The subcutaneous mass is thickened and formed of inflammatory tissue, and does not include the sphincter If the operator be in doubt, he should cut slowly the different levels over the director and in this way will reach the external and visible sphincter, and will cut or respect it according to the case

Fistulæ are said to be *complicated* when there are many tracts branching from each other They are said to be *simple* when there is one orifice of entrance and one of exit Most frequently the internal opening is situated in the middle plane of the body in front or behind at 6 or at 12 o'clock

The track of an old fistula gives the impression of a resistant, hard, and fibrous tube The amount of fibrous tissue is proportionate to the age of the fistula

Generally a fistula is more extensive than is thought at first sight The internal opening is often situated about 2 centimetres from the skin of the anus, but the canal may be prolonged above the internal opening and end in a pocket

A Fistula is preceded by an Abscess at the Margin of the Anus — It is because the abscess has been badly operated upon, and too late, and not well looked after, that the fistula occurred. The best treatment for the abscess is that of Lockhart-Mummery It consists in not *incising* the abscess but in *excising* the whole portion of the perinæum covering it The suppurating focus should be *transformed into a tunnel* with the apex above and the base below in the skin, and in this way by dressing the surface, the abscess closes rapidly without the formation of a fistula

A Fistula left to itself tends to send out Branches or Pockets.— It then lasts indefinitely If every abscess were well operated upon there would be *no fistula of the anus* If the fistulæ were thoroughly examined probed well operated upon and dressed, they would usually heal at once and without incontinence.

Are Fistulæ in Ano sometimes due to Tuberculosis ?—Yes, but rarely—one in six.

In the tubercular fistula there is little fibrous tissue, it is simply lined by tubercular granulations The track of an ordinary fistula is lined with fleshy vegetations

SIMPLE FISTULÆ —A simple fistula is one in which the track is straight, and there are two openings—an internal within the anus, and an external cutaneous one behind or in front of the anus most often in the vertical plane The fistula is generally superficial and does not pass above the external sphincter, so that division of the fistulous track does not sacrifice the muscle

FISTULÆ WITH MANY OPENINGS —The numerous orifices are especially met with in old fistulæ, it is rare to find more than one internal opening

Generally, the opening behind the anus corresponds to an internal orifice in the posterior part of the anus The cutaneous openings in front of the anus at 12 o'clock answer to an anterior or internal orifice

HORSE SHOE FISTULÆ —The track forms a semicircle in front of or behind the anus

This form is frequent the internal opening is often situated at 6 or at 12 o clock The cutaneous track separates each side of the anus, and ends in two lateral cutaneous openings The situation of the track and the two orifices must be exactly marked out by the grooved director or by the finger An anterior horse-shoe fistula is rarely complicated and is always easy to treat

Should Simple Fistulæ be operated upon in Patients suffering from Tuberculosis ?—*A patient suffering from tuberculosis can have a non tubercular fistula and an otherwise healthy patient may suffer from a tubercular one.*

The edges of a tubercular fistula are thin, the neighbouring skin is violet in colour and thinned

If the tuberculosis be advanced do not operate, open the orifice and drain it If the tuberculosis be very chronic, or active, it is not to the patient s interest to allow suppuration and more infection It is better to perform a simple division with the thermo-cautery Every tubercular fistula should be treated in the same way in an otherwise healthy patient It should be divided by the thermo-cautery and cauterised Three times in apparently healthy patients, on whom we operated for a simple fistula, pulmonary tuberculosis

supervened some months later They were ultimately cured of both diseases

Should Operation be performed on a Diabetic Patient?—The answer is the same as in tuberculosis. If the fistula be troublesome, and the amount of sugar slight, operate

Should Emollient Injections be made into the Fistulæ?—The injection of a bismuth paste allows us to follow the track of the fistula by the X rays. The injection of methylene blue not only slightly disinfects the track before operation, but also facilitates its examination It is often to be recommended in cases of complicated tracks

OPERATIVE TREATMENT OF PERI ANAL FISTULÆ.—It is rarely necessary to cut the external sphincter Most often the sphincter is not included in the tissues which have to be divided If the sphincter must be cut, certain precautions are necessary Permanent incontinence of the anus is worse than no operation on the fistula Numbers of fistulæ are not cured, even with an operation, because the latter has been badly performed and the fistula badly attended to * In order to cure them, they should be opened, the track exposed, drained, disinfected, and well dressed until at any rate the deep layers are cicatrised The rectal wound heals less quickly than the cutaneous Inattention to these important details is the cause of want of success The wound should be kept open in such a way that the rectal part closes before the cutaneous. The want of success is due to insufficient drainage, and also because the latter has not been continued throughout the whole period of cicatrisation If cicatrisation be at first rapid and when the fistula appears to be nearly cured healing ceases the conclusion should be drawn that drainage is insufficient. When a fistula is above the sphincter and the track complicated, the external part must be cut, and the whole extent of the track be well drained without cutting the sphincter, it is better to perform an insufficient operation without incontinence *than to make a large incision with permanent leakage* It is better to operate in two stages in order to open a fistula and avoid incontinence, than to operate a second time to suppress the incontinence a first operation has produced (Lockhart Mummery) †

Should a Fistula be excised or incised? Should it be left to heal by itself, or should it be sutured?—Each of these methods has its

* Lockhart Mummery "Surgery of the Colon and of the Rectum." Baillière London

† Lockhart Mummery *loc cit*

indication On principle, a fistula should be excised and left to heal by itself, but there are exceptions to this rule For instance, lateral fistulæ above the sphincter—those, *e g*, at 3 o'clock—should be sutured after excision, when it is certain all the tracks have been removed When they are not sutured immediately, it is wise to excise them at a second stage, first incise the external subcutaneous part, and then at a second stage open the sphincter in order to drain the internal opening

Complete immediate suture is not, as a rule to be recommended During cicatrisation new pockets can form, and these prevent healing of the wound and often require a new separation of *attachments, which prolongs convalescence* In short, open cicatrisation is more certain than if the tissues be sutured But with fistulæ with complicated tracks, after excision of all the tracks, partial suture of the cutaneous wound is advantageous, as it decreases the amount of cicatricial tissue and prevents deformity of the anus

PREPARATION OF THE PATIENT —This plays an important part The patient should be purged then fast for forty-eight hours and the bowel should then be washed out Just before the operation the rectal ampulla should be carefully washed with soapy water and with ether this should take four or five minutes Lockhart-Mummery says washing before the operation for fistula in ano should take as long as the operation itself

TREATMENT OF SIMPLE FISTULÆ —*Begin by making a minute* examination taking note whether there be any pockets or not, re-examine at the time of operation to confirm the diagnosis of the lesions

The injection of methylene blue some days previously is very useful to mark out the pockets

The operator should explore with a grooved director with a blunt point if the instrument be pointed a false passage may be made, and the wall of the fistulous track pierced the anatomical information would then be false Having placed the director in position, the overlying superficial tissues should be cut with the knife, over the groove of the director Tissue forceps should then separate each border of the wound which will be thus spread out The granulation tissues of the canal should be curetted and then examined in a good light to see if there be any passage branching off from the canal. The opening of the pocket appears as a dark point If the fibrous tissue be thick it must be excised, as well as the edges of

the wound The canal when well opened shows a bleeding surface spread out as a tunnel, the edges do not overhang the wound during cicatrisation Directly the whole canal is excised, the vessels should be obliterated by torsion or by a linen ligature If they bleed, compresses soaked in saline water should be employed. If to open the canal division of the rectal mucosa has been required, the latter bleeds more, a large drainage tube, surrounded by gauze, which exercises pressure, should then be placed in the rectum The tube should be fixed by a safety pin surrounded by a strip of linen

OPERATION FOR COMPLICATED FISTULÆ —When there are many tracks communicating with the same internal orifice, each of them should be opened, and the internal opening divided last, *radially from the anus*

If the sphincter must be cut, the incision should preferably be made in the antero-posterior direction, in the sagittal plane of the body If there be a lateral internal orifice, it should be incised radially from the anus it is sometimes better to perform the operation in two stages, and to reserve for a later date division of the sphincter

Oblique incision into the sphincter should be strongly forbidden, as it produces incontinence or a deformed anus

Never cut the sphincter at two different points of its circumference.

In some cases of lateral fistulæ situated low down, the operator may find it better to divide the canal and the sphincter at once, to excise the fibrous tissues, and immediately to suture the two ends of the muscular ring But, in cases of lateral fistula, situated very high up, two stages are required first excise the track, and especially a large cutaneous flap, drain well the whole of the separated canal and incise the fibrous tissue, and leave cutting the sphincter and the intestine for a later date

Anal fistulæ with internal lateral orifices, highly placed, are so difficult to operate upon and attend to that Lockhart-Mummery states they should be entrusted entirely to a specialist in rectal surgery The number of cases remaining incontinent after operation for this form of fistula is large *

TREATMENT OF HORSE SHOE FISTULA —The one or the many tracks forming this fistula are to be opened, on a grooved director, by one of the internal openings The division is not to include the intestine Each external track should be opened *one after the other* until only the fistulous canal directed in front to the internal

* Lockhart Mummery *loc cit*

or rectal opening remains. Then, this track from behind forwards or the reverse is to be divided over the director in the vertical plane of the body

It is easier to begin by entering the internal orifice It is often necessary, in order to see it, to dilate the sphincter and to insert a speculum. A grooved director should then be introduced by the rectum into the internal orifice and directed towards the external The skin is then to be cut *over the* point of the director which emerges from this artificial opening, the tissues charged by the director are then to be cut, and the other tracks divided in the same way by passing the director into the posterior part of the first incision. If the fistula be long, the operation should be performed in two stages the external track is to be opened at the first operation When the canal is nearly healed, the posterior track communicating with the intestine should be opened at the second stage

If the operator perform the operation in one stage, cicatrisation of the transverse tracks deforms the axis of cicatrisation of the vertical branch, this produces a malformation of the anus and a risk of incontinence When, on the other hand, the sphincter is cut secondarily, it is already embedded in the embryonal tissue which maintains the two muscular extremities in a favourable position for a regular apposition. Operation in two stages ought to be performed by a specialist in rectal surgery, as he alone will know how to avoid the risks of incontinence (Lockhart-Mummery)

In the surgery of fistula in ano, two complications are constantly to be feared (*a*) non-cicatrisation (*b*) especially incontinence

Fistulæ in the Wall of the Rectum —A surgeon opens the track of a fistula between the two openings, internal and cutaneous, and on exploring the groove resulting from the incision notes the canal does not end at the opened internal orifice, but ascends along the rectum parallel to its walls Should the track be opened and the pocket be removed? This is simplest, but Lockhart-Mummery finds it is better not to cut it, but simply to drain it It must be dilated, and then a drainage tube inserted, fixed by a safety pin If there be two similar pockets, each should be separately drained in the same way The tubes should be gradually shortened as the track heals If it be difficult to retain the tubes, they should be replaced by a small strip of gauze If the tracks be slow to heal, they should be stimulated with nitrate of silver and then a strip of gauze pushed up to the end of the cul-de-sac This is the best treatment if the tracks be in the substance of the rectum and outside

the muscular coats, but if they be submucous, they should be opened into the intestinal side with scissors The rectum should then be irrigated twice a day and the wound carefully dressed It heals easily and rapidly

When the tracks are submucous and extend very high division may produce hæmorrhage the rectum should be tamponned with cotton wool round a tube, and the patient watched for forty-eight hours

FISTULÆ WITH A LATERAL INTERNAL ORIFICE —They are rare, but require careful treatment to avoid incontinence after operation If the sphincter must be divided, great care must be taken to cut it at a right angle, and to leave a rectilinear wound which will heal in such a way that the extremities of the sphincter will be exactly in contact after healing The ideal treatment of such fistulæ is excision followed by suture, but good results are obtained by simple incision, provided care be taken never to cut the sphincter obliquely In cases of large fistulæ with a lateral orifice, operation should preferably be performed in two stages The first division should avoid the sphincter, which should be cut fifteen days later at the second stage

BLIND INTERNAL FISTULÆ —*The sphincter should be dilated* with the speculum. A grooved director should be introduced into the fistula by the internal orifice in the rectum its point should be made to protrude under the skin, which should be cut over the prominence, the tissue covering the director should be incised The remainder of the operation is the same as in a complete fistula

BLIND EXTERNAL FISTULÆ.—There may be two or three external openings having no communication with the intestine The canals should be opened by a crucial incision in the skin and the tissues excised, so as to produce a tunnel, the part of the superficial wound being broader than the deep part If there be no communication with the intestine, the rectum should not be opened, the cutaneous incision should be large, broad and gaping

FISTULA WITH TWO INTERNAL OPENINGS —*They should not be* divided at the first operation, unless they lie one above the other, so that one incision can include them The best plan is therefore, to open one, and to treat the other when the first is healed

EXCISION OF FISTULÆ FOLLOWED BY SUTURE —This procedure is applicable only to simple cases (rare) or where the fistulæ have lateral openings It is essential to carry out the operation under

the strictest asepsis, for the wound ought to unite by first intention The fistulous track should be sterilised by an injection of methylene blue which colours the tracks The track should be cut over the director and excised If the whole canal has been removed, the wound should be cleaned with ether and the suture made with silk worm gut, as in a perineorrhaphy The stitches should be moderately tight

AFTER TREATMENT OF OPERATIONS FOR FISTULÆ —The surgeon ought himself to attend to the after treatment, lack of this attention explains many failures The fistula ought to heal in less than a month

The wound should be kept as clean as possible, suppuration avoided, and the dressing changed two, three, or four times a day At the beginning the dressings should be warm and moist, warm fomentations over the wool covering the wound. The wool should remain in position for many days, and should only be changed when soiled. The bowels should be opened the third or fourth day by a laxative and by an oil injection After the first evacuation, the patient should sit in an antiseptic bath, morning and evening The cotton-wool dressings should be removed in the bath, and a new layer of cotton wool applied The wound should be dressed with small swabs of cotton wool on a grooved director which should push them into the smallest corners When granulations appear, they should be protected against friction by vaseline No more antiseptics should now be used only saline or oxygenated water From time to time cauterisation by nitrate of silver should be employed to activate cicatrisation The patient should be constantly watched to the end and should remain in bed until healing is complete He should not get up or walk until the wound is firmly healed, if he rise earlier, time will be lost as convalescence will be delayed

Causes of Slow Cicatrisation of an Anal Fistula.—(*a*) A badly performed operation (*b*) insufficient drainage, (*c*) formation of a bridge of cicatricial tissue above the base of the wound

Commonly the operator omits to excise a corner of the track and an invisible cul-de-sac hence delay in cure The operation must be performed again

Frequently it is the rectal opening that has been overlooked during the operation if a fistula does not heal rapidly it is because the internal opening has not been opened It is necessary to operate again The patient is told that the reason why the fistula

has not healed is because his health is bad or the fistula is a tubercular one this is wrong the real reason for insuccess is that the operation has been badly performed

Lockhart-Mummery has noted at St. Mark's Hospital that a third of the cases of fistula have been operated upon by other surgeons, and were not cured, because a canal had been overlooked. In other cases, slow cicatrisation is due to insufficient drainage, to the external excision of the wound having not been made large enough, and because the external wound had healed before the deep rectal one A bridge of cicatricial tissue has formed over the wound, and has hindered healing This shows the wound has not been well dressed, the bridge ought to be cut over a grooved director

Delay in healing from general weakness is very rare When a fistula refuses to heal, the patient should be sent to the seaside or to the country, but in the great majority of cases, if cure be not obtained, it is due to a badly performed operation or from want of care in dressing In every case of tuberculosis or of diabetes or of syphilis, the surgeon must have the patient under his care before operation

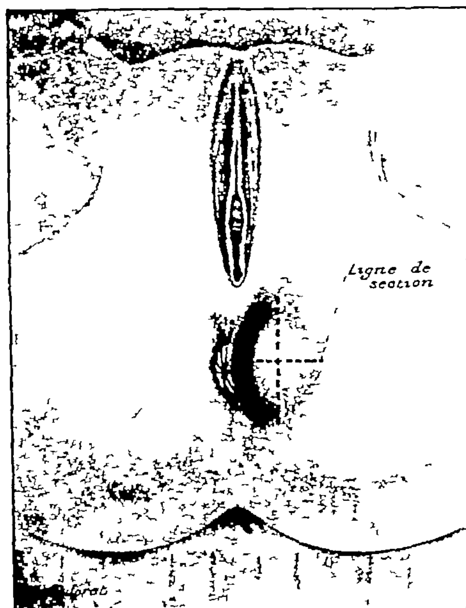


FIG. 113.—ABSCESS AT THE MARGIN OF THE ANUS.

Origin of fistulæ How the abscess should be opened to avoid a fistula. Very large crucial incision.

Ligne de section=Line of incision

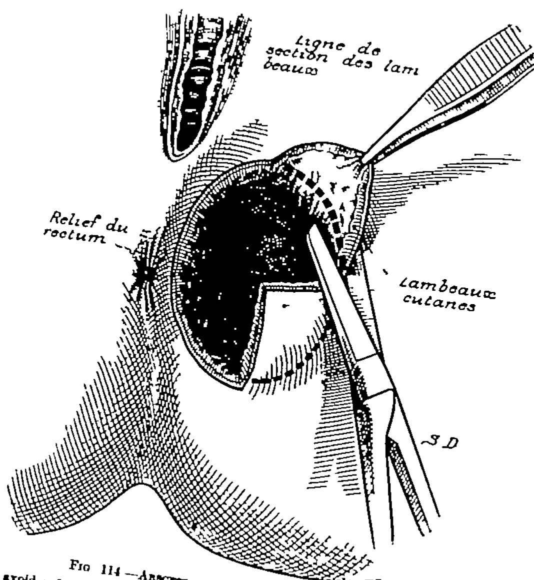


FIG 114 —ABSCESS AT THE MARGIN OF THE ANUS

How to avoid a fistula without cutting the sphincter The cutaneous surface should be excised to change the focus into a tunnel. Surface dressing

Ligne d sect on des lambeaux=Line of incision of the flaps *Relief du rect m*=Outline of the rectum *Lambeaux cutanés*=Cutaneous flaps

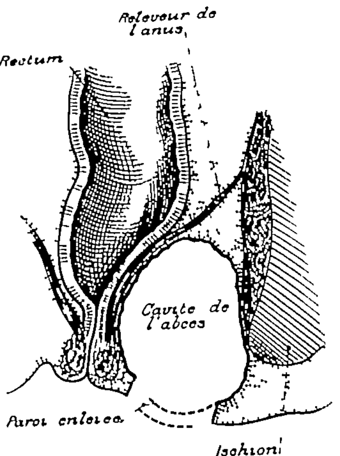


FIG 115.—ABSCESS AT THE MARGIN OF THE ANUS.

Section corresponding to the preceding figure. The abscess heals from above and below under the surface dressing It is unnecessary to divide the sphincter

Releveur de l'anus=Levator ani *Rectum*=Rectum *Cavité de l'abcès*=Abscess cavity *Paroi enlevée*=Wall removed *Ischion*=Ischium

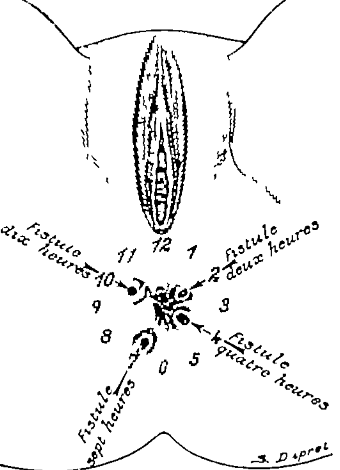


FIG 116.

Sites of the external openings of complete fistulæ, named after a sun dial.

Fistule dix heures=Fistula at 10 o clock *Fistule deux heures*=Fistula at 2 o clock *Fistule quatre heures*=Fistula at 4 o clock. *Fistule sept heures*=Fistula at 7 o clock

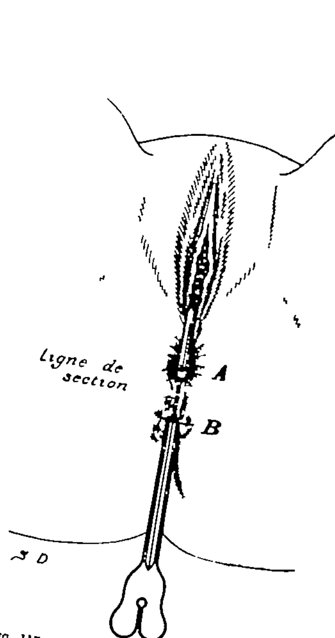
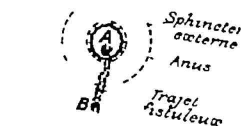
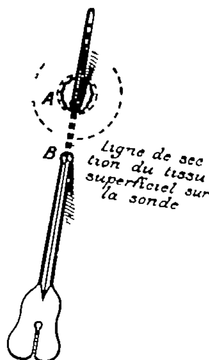


FIG 117.—FISTULA (BELOW THE SPHINCTER, IN THE MID-LINE, WITH ONE STRAIGHT TRACK).

Superficial site below the sphincter. Complete fistula occupying the mid line. All the conditions are favourable. The director passes under the soft tissues. The canal is incised and then excised.

Ligne de section = Line of division





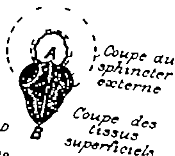


FIG. 118. — COMPLETE FISTULA AT 6 O CLOCK ABOVE THE SPHINCTER.

The canal marked out by the director and the finger is seen. The cut sphincter is very well restored when the canal occupies the mid line. The lateral divisions of the sphincter at 3 and at 9 o clock are less easily repaired.

Sphincter externe = External sphincter. *Anus* = Anus. *Trajet fistuleux* = Fistulous track. *Ligne de section du tissu superficiel sur la sonde* = Line of division of the superficial tissue over the director. *Coupe du sphincter externe* = Section of the external sphincter. *Coupe des tissus superficiels* = Section of the superficial tissues.

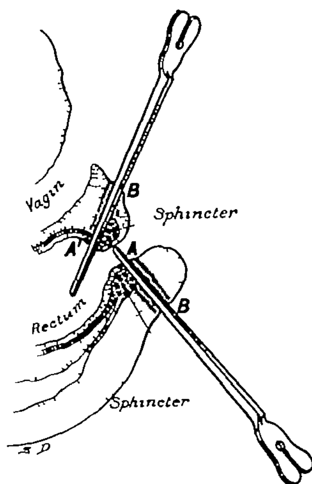


FIG 119 —FISTULÆ AT 12 AND AT 6 O CLOCK IN THE MID-LINE.

The canal AB appears to be below the sphincter because the chronically inflamed tissues are thick. The operator thinks he will cut the sphincter but it is not so The muscle is preserved this is preferable. On the other hand, the canal A'B is above the sphincter which will be cut but this is of little importance, since the fistula is in the mid-line of the body

Vagin=Vagina. *Sphincter*=Sphincter *Rectum*=Rectum.

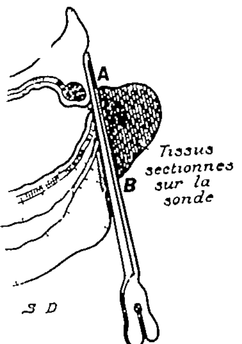


Fig 120 —Fistulous Track at 6 o Clock, above the Sphincter, covered by Great Thickness of Inflammatory Tissue.

The operator must see the sphincter in order to preserve or to cut it. The knife should proceed level by level. Sometimes the operation is performed in two stages. The sphincter should be cut some weeks later and apposition will be better Immediate division of the sphincter is of no consequence in fistulæ in the mid line. Operation in two stages is to be recommended with fistulæ, for example at 3 and 9 o clock.

Tiss s secti nn s sur la sonde=Tissues divided over the directo

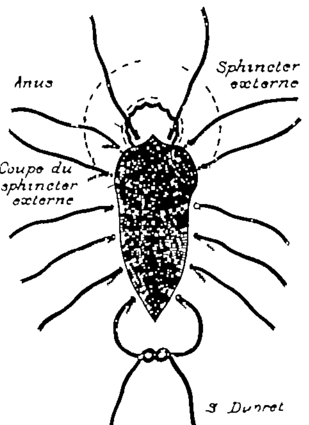


Fig 121 —Complete Excision of a Fistula above the Sphincter with Immediate Restoration

This operation is especially to be recommended for a lateral fistula at 3 or at 9 o clock. In cases of fistula in the mid line the sphincter unites without incontinence even without suture.

Anus=Anus. *Sphincter externe*=External sphincter *Coupe du sphincter externe*=Section of the xternal sphincter

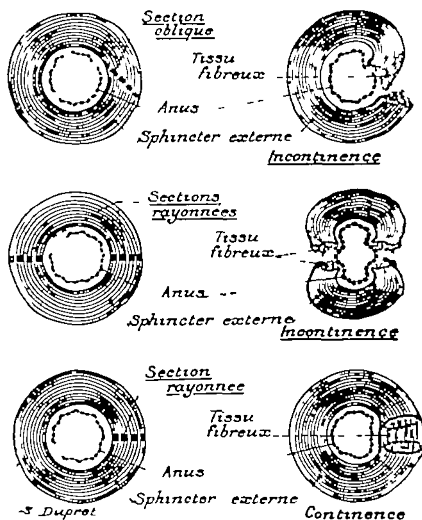


FIG 129 —LATERAL FISTULÆ.

Appearance of the sphincter according to the incision. The prognosis of these fistulæ is much more serious from a functional point of view Above the sphincter is cut obliquely (bad), and produces incontinence, because cicatrisation does not take place in the direction of the muscular fibres (Lockhart Mummery). Lower down, the sphincter cut at two points, will become incontinent from contraction of the two semicircles (bad). Still lower the incision is made radially from the anus (very good).

The figure on the right shows the result when the division is made in two stages. In the first stage, excision of the canal is performed outside and above the sphincter without cutting the latter Cicatricial tissue forms round the preserved sphincter At the second stage the muscle is cut. Apposition is then very good, owing to the fibrous tissue which supports the divided stumps of the sphincter (Lockhart Mummery).

Section oblique=Oblique incision *Tissu fibreux*=Fibrous tissue *Anus*=Anus *Sphincter externe*=External sphincter *Incontinence*=Incontinence *Sections rayonnées*=Radial incisions *Continence*=Continence

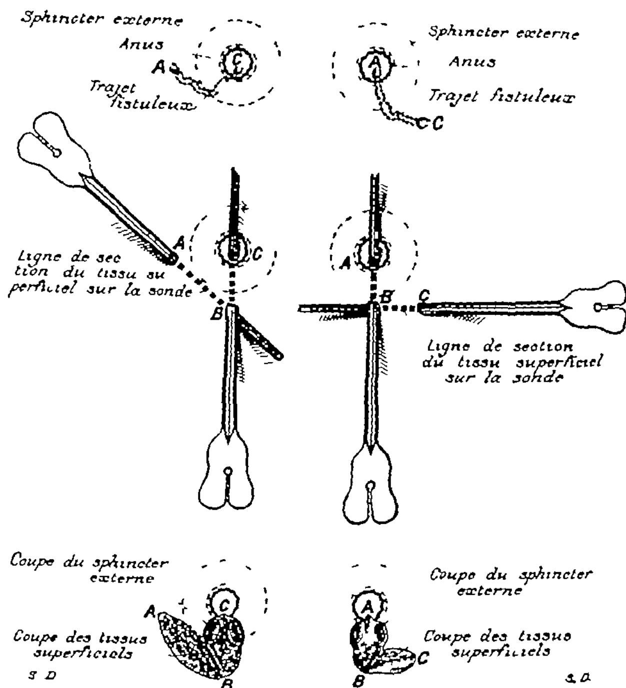


FIG. 123.—FISTULA WITH IRREGULAR TRACK.

The fistula AC has a curved track; it opens into the rectum at 6 o clock and into the skin at 8 o clock. It must be divided in two stages. The director is first passed from 8 to 6 o clock below the skin the fistula is cut. The two tracks are excised. The lower figure shows the appearance of the lesions after excision.

Sphincter externe—External sphincter *Anus*—Anus *Trajet fistuleux*—Fistulous track *Ligne de section du tissu superficiel sur la sonde*—Line of division of the superficial tissue over the director *Coupe du sphincter externe*—Division of the external sphincter *Coupe des tissus superficiels*—Division of the superficial tissues

FIG. 124.—OBLIQUE FISTULOUS TRACK THE EXTERNAL ORIFICE OF WHICH IS AT 5 O CLOCK AND THE INTERNAL OPENING AT 6 O'CLOCK.

The annexed figures show the direction of the track and of the incision.

Sphincter externe—External sphincter *Anus*—Anus *Trajet fistuleux*—Fistulous track. *Ligne de section du tissu superficiel sur la sonde*—Line of division of the superficial tissue over the director *Coupe du sphincter externe*—Division of the external sphincter *Coupe des tissus superficiels*—Division of the superficial tissue

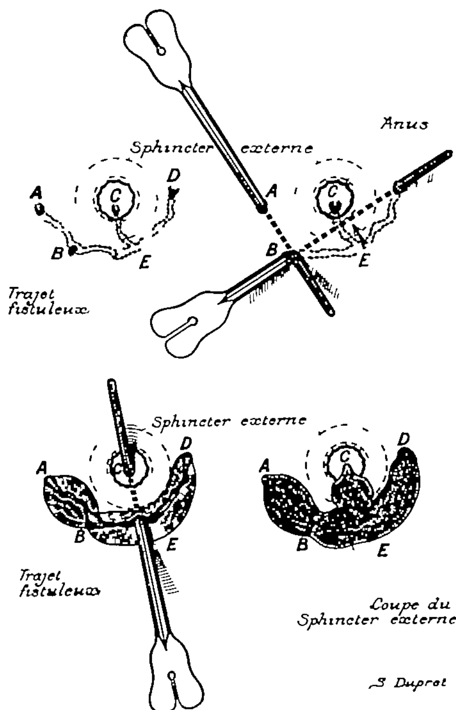


FIG 125.—FISTULA WITH MANY ORIFICES AND WITH COMPLICATED TRACKS.

The fistula has been operated upon in two stages. The two upper drawings correspond to the first stage where the subcutaneous tracks are open. The divisions in the lower drawings are part of the second stage, which is therefore performed when AB, DE are already covered with newly formed tissue.

Sphincter externe=External sphincter *Anus*=Anus *Trajet fistuleux*=Fistulous track
Coupe du sphincter externe=Division of the external sphincter

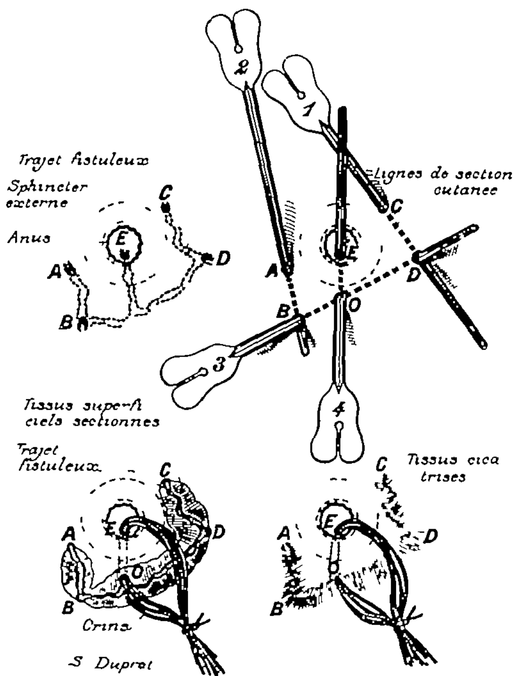


FIG 126 —FISTULA COMPLICATED WITH AN INTERNAL ORIFICE AND FOUR EXTERNAL OPENINGS.

The director 1 opens the track CD the director 3 opens the track BD director 2 AB, and 4 marks the track EO The orifice O has been exposed only after director 3 has opened the track BD

Below and to the left, appearance of the operative field after opening the tissues by the directors 1 2 3

The director 4 has been replaced by a bundle of silkworm gut in the track below the sphincter The subcutaneous tissues are cicatrised. and the operator must remove the track FO The deformities of the anus which could prevent the functional action of the sphincter are thus avoided (operation in two stages).

Trajet fistuleux = Fistulous track *Lignes de section cutanée* = Line of cutaneous incision *Sphincter externe* = External sphincter *Anus* = Anus *Tissus superficiels sectionnés* = Superficial tissues divided. *Tissus cicatrisés* = Cicatrised tissues *Crins* = Silk worm gut

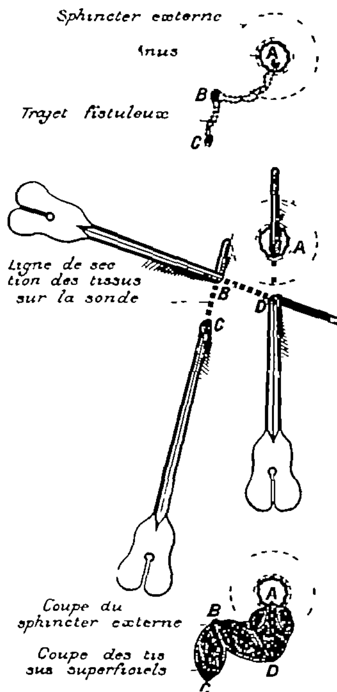


FIG 127—FISTULA COMPLICATED WITH TWO EXTERNAL OPENINGS AND WITH ONE INTERNAL ORIFICE.

Operation in one stage The surgeon opens the track BC over a director; the director pierces the skin at D The new external opening is thus placed exactly opposite the internal fistula at 6 o clock

Below result of excision of the tissues.

In a similar case, it is advantageous to excise the track at BC and BD deeply and to suture the wound CB and BD so that only AD remains, and this should be united secondarily

Sphincter externe=External sphincter *Anus*=Anus *Trajet fistuleux*=Fistulous track *Ligne de section des tissus sur la sonde*=Line of division of the tissues over the director *Coupe du sphincter externe*=Division of the external sphincter *Coupe des tissus superficiels*=Division of the superficial tissues

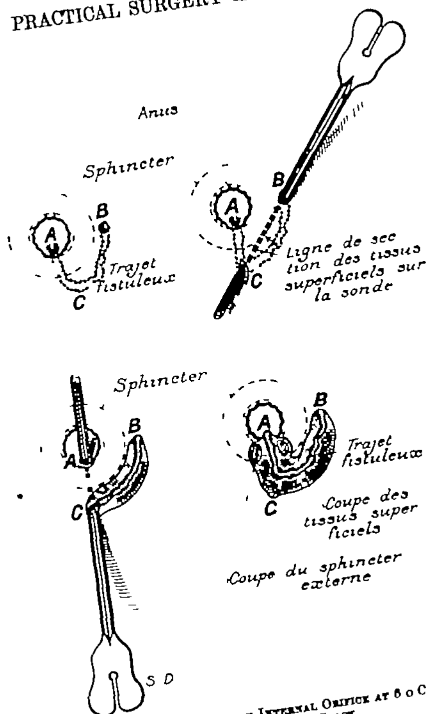


FIG. 128.—FISTULA COMPLICATED WITH INTERNAL ORIFICE AT 6 O'CLOCK AND EXTERNAL OPENING AT 3 O'CLOCK.

The sphincter must not be cut obliquely It would be very easy to follow the whole canal with the grooved director entering at B and coming out at A. In these conditions the sphincter would have to be cut obliquely but incontinence would result The curve track must be cut in two directions.

On the right, the director first traverses BC and perforates the skin; the canal is opened an excised. The director is then passed from behind forwards, directly to the opening and then only the canal is cut In a similar case it would be advantageous to exci the track completely and to suture BC.

Anus = Anus *Sphincter* = Sphincter *Trajet fistuleux* = Fistulous track *Ligne de sect des tissus superficiels sur la sonde* = Line of division of the superficial tissues over the direc *Coupe des tissus superficiels* = Division of the superficial tissues *Coupe du sphin externe* = Division of the external sphincter

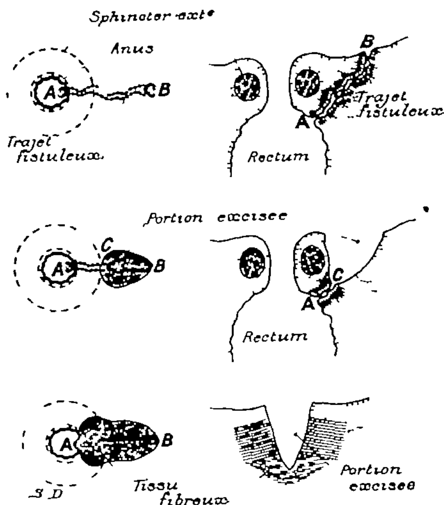


FIG 129 —LATERAL FISTULA ABOVE THE SPHINCTER.

It is more difficult to obtain a normal functional anus. At AB the fistulous track is seen from the perinæum and at the side on section.

Lower down, the operator has cut, like a tunnel, the whole external part of the track, beyond the sphincter

The last figure shows the track opened and the external part excised the excision scoops out the tissues like a tunnel and respects the sphincter The tract AC above the sphincter remains; the external wound is covered with fleshy vegetations the cicatricial tissue encircles the sphincter it can then be cut, since it is supported by cicatrising tissue, which keeps the two extremities of the muscle in position.

Sphincter exte.=External sphincter *Anus*=Anus *Trajet fistuleux*=Fistulous track *Rectum*=Rectum *Portion excisée*=Excised portion *Tissu fibreux*=Fibrous tissue

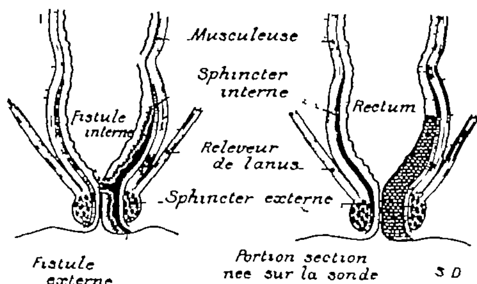


FIG 130

When the grooved director enters by the external orifice and emerges by the internal one the apparent canal does not always correspond with the real one. A pocket often exists higher up; here it is submucous. After the canal has been opened over the director between the two openings, the pocket should be explored and opened.

Hæmostasis must be watched, for fistulæ such as these often bleed. They should be tamponned over a rubber tube which should remain *in situ* for forty-eight hours.

Musculeuse=Muscle *Sphincter interne*=Internal sphincter *Rectum*=Rectum *Fistule interne*=Internal fistula *Releveur de l'anus*=Levator ani. *Sphincter externe*=External sphincter *Fistule externe*=External fistula *Portion sectionnée sur la sonde*=Part divided over the director

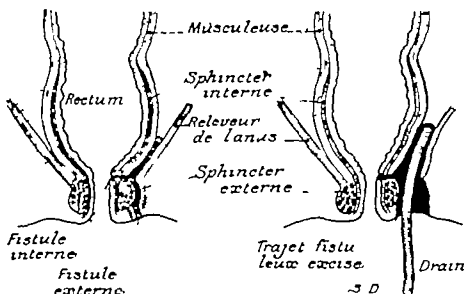


FIG. 131

Like the preceding figure the fistulous track (below the sphincter) is continued by a pocket which is not submucous, but between the rectal muscular wall and the levator ani. It is possible to cut open at the same time the sphincter and the rectal wall, but hæmorrhage occurs and apposition is imperfect. It is better to treat the condition as in the right figure the peri-anal tissues should be opened as in Fig 126 and the tissues covering the canal excised without troubling about the internal opening; the pocket should then be drained: it should gradually be closed from above below because the external opening is much larger than the internal. The dressings ought to be applied so that the opening closes from above below. When the pocket is completely healed, the fistula should be made complete above the sphincter as in the conditions drawn at the bottom of Fig 126.

Musculeuse=Muscle *Rectum*=Rectum *Sphincter interne*=Internal sphincter *Releveur de l'anus*=Levator ani *Sphincter externe*=External sphincter *Fistule interne*=Internal fistula *Trajet fistuleux excisé*=Fistulous canal excised *Fistule externe*=External fistula *Drain*=Drainage tube

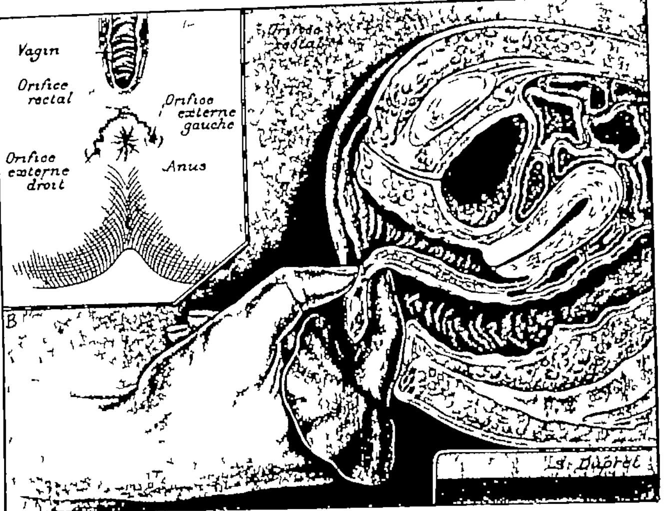


FIG 132 —HORSE-SHOE FISTULA WITH A RECTAL OPENING AT NOON AND TWO CUTANEOUS ORIFICES.
The finger introduced into the rectum marks out the canal
(This figure and the three following are drawn from an operation performed by Lockhart-Mummery in London, 1923.)

Vagin = Vagina   *Orifice rectal* = Opening in the rectum   *Orifice externe gauche* = Left external opening   *Orifice externe droit* = Right external opening   *Anus* = Anus

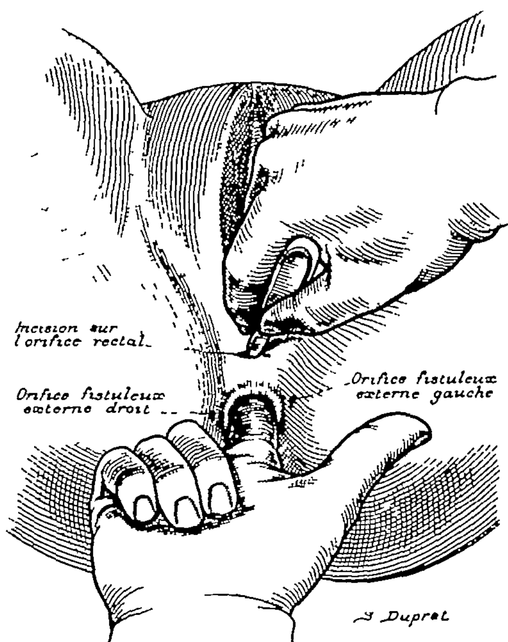


Fig 133—Horse-shoe Fistula.

The operator's left index finger in the anus (by mistake the right hand has been drawn). The operator incises the skin to expose the canal the knife opens the cavity of the canal through which the grooved director is introduced.

Incision sur l'orifice rectal=Incision over the rectal opening *Orifice fistuleux externe droit*=External right fistulous orifice *Orifice fistuleux externe gauche*=External left fistulous orifice

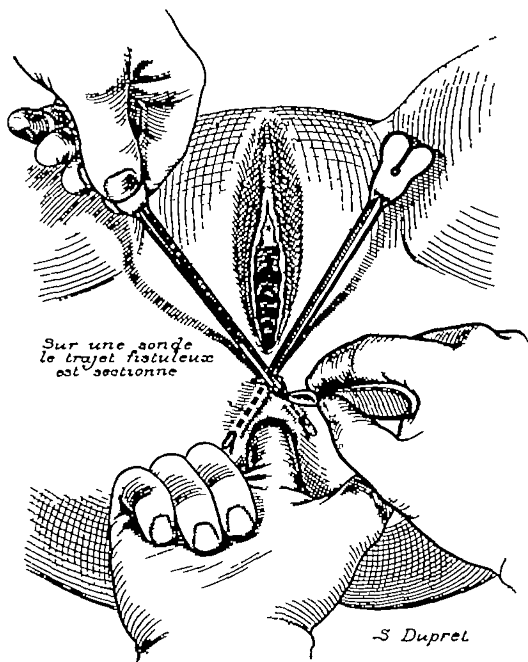


FIG 134 — HORSE-SHOE FISTULA.

The grooved director is introduced by the artificial cutaneous opening and passes out through one of the cutaneous orifices. The canal is divided one side at a time.

Sur une sonde le trajet fistuleux est sectionné — The fistulous track is divided over a director

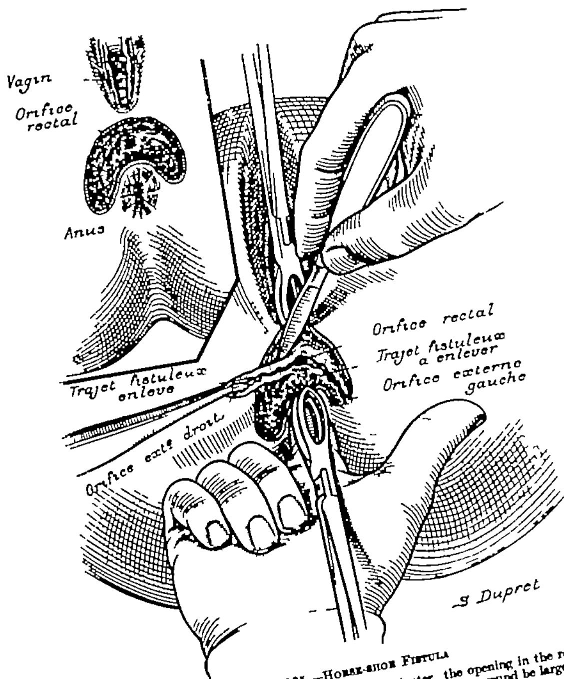


Fig. 125 —Horse-shoe Fistula

Excision of the track The fistula is above the sphincter the opening in the rectum has the best chance of closing spontaneously if the cutaneous wound be large.

Vagin = Vagina *Orifice rectal* = Opening in the rectum *Anus* = Anus *Trajet fistuleux enlevé* = Fistulous track removed *Trajet fistuleux à enlever* = Fistulous track to be removed *Orifice externe droit* = External right opening *Orifice externe gauche* = External left opening

XI

RADICAL CURE OF FEMORAL HERNIA BY THE INGUINAL ROUTE

By M. ROBINEAU

THE methods of cure of femoral hernia are innumerable, I shall not make a critical study of them The preference ought to be given to the inguinal route for the following anatomical reasons

In the antero-posterior section represented in Fig 137 the hernial orifice is bounded in front by the crural arch, and behind by the pectineus, above it therefore above the neck, the sac is prolonged by a tunnel at least 2 centimetres in length, a true pedicle invisible on the femoral side and difficult of access by manipulations carried out under the arch of Fallopius Accessible above the arch (inguinal route), the hernial pedicle, which is apt to return can be resected entirely

Fig 136 shows schematically the crural arch slightly concave below in its external part (psoas iliacus) slightly convex below in its internal part (vessels and hernia) Nearly all the methods for closing the hernial orifice make use of this powerful ligament, by the femoral route, the sutures tend to lower the arch towards the pectineus and draw without any advantage whilst exaggerating the convexity of the ligament, by the inguinal route the sutures tend to raise the arch which allows of its concave curve being above

Where should the arch be fixed in order to close the hernial opening ? Cooper's ligament, which is a thickening of the periosteum of the pectineal crest is at the upper limit of the hernial pedicle (Fig 137) and lends itself admirably to a firm suture It can be reached by the femoral route but only in the part which adjoins the spine of the pubis either the arch or Gimbernat s ligament must be cut or the pubis chiselled By the inguinal route the whole extent of Cooper s ligament is accessible without traction on any important organ But it is not sufficient to suture these fibrous bands, in order to make firm the opening of a hernial orifice muscular tissue is required by the femoral route a myoplasty is necessary (E Schwartz) the inguinal route allows the operator to make use of the muscles of the abdominal wall

The superiority of the inguinal route is undeniable The procedure which I will describe was shown me twenty years since by Tuffier, it was, I believe, brought from Italy, where Ruggi practised it I have used it in all femoral hernias, great and small, in which a radical cure was indicated, *without ever having observed a recurrence*

Operation for Left Femoral Hernia in the Female —First Stage —*Preparation of the Inguinal Route.*—The incision ought to be inguinal—that is, above the arch, but not excessively so—in order to allow of an easy access to the femoral region Cut the skin, and then at once attack the hernia, I have represented here the complete preparation of the inguinal canal as far as the fascia transversalis

Second Stage —*Femoral Stage* —This consists in exposing the hernial sac, separating and opening it, reducing the intestine, if there be any, and freeing and resecting the omentum if it be too large.

Third Stage—*Removal of the Hernia into the Inguinal Region* —The sac and what remains of the contents must be brought through the femoral opening into the inguinal region which has been prepared for this purpose

Fourth Stage—*Radical Cure* —In order to close the hernial orifice well, a solid thread must be tied very deeply into the external part of Cooper s ligament. This is not easy some precautions are necessary The external iliac vein can be pricked if care has not been taken to pull it aside, a pointed needle can puncture the intestine, lastly, the surface of Cooper s ligament may only be seized, and firmness of the suture will be wanting The thickness of this ligament is always considerable it cannot give way if the loop of *the thread surrounds it entirely as far as the bone*

Operation for Femoral Hernia in the Male —All the stages of the operation are the same, but at the time of the radical cure an in*guinal canal must be preserved for the passage* of the cord The threads, therefore should be passed as in Bassini's operation but with the following modification the deep threads below the cord should include not only the crural arch and the internal oblique and transversalis muscles, but also Cooper s ligament two threads are sufficient for closing the deep level In front of the cord superficial threads should unite the two lips of the external oblique

I have always found two threads sufficient, both in the male and in the female to close completely both the femoral opening and the inguinal canal I have used indifferently catgut linen, silkworm gut and silk

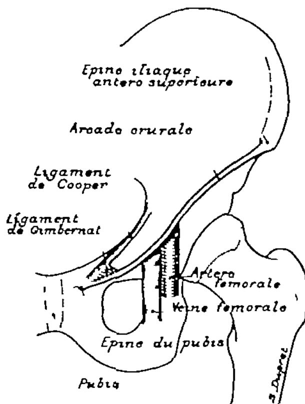


FIG 136.—ANATOMY OF THE REGION
The crural arch, front view

Épine iliaque antéro-supérieure=Antero-superior iliac spine. *Arcade crurale*=Crural arch *Ligament de Cooper*=Cooper's ligament. *Ligament de Gimbernat*=Gimbernat's ligament *Artère fémorale*=Femoral artery *Veine fémorale*=Femoral vein *Épine du pubis*=Spine of pubis *Pubis*=Pubis

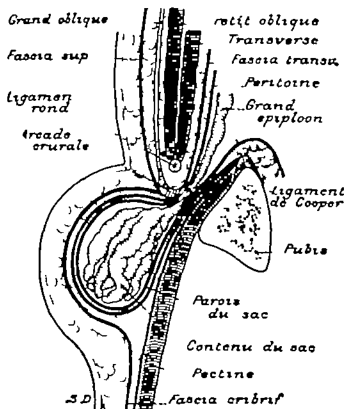


FIG 137.—ANATOMY OF THE HERNIAL REGION
Schematic longitudinal section passing through the hernia.

Grand oblique=External oblique *Petit oblique*=Internal oblique *Transverse*=Transversalis muscle *Fascia sup.*=Superficial fascia. *Fascia transv*=Fascia transversalis *Péritoine*=Peritoneum *Ligament rond*=Round ligament. *Grand épiploon*=Great omentum. *Arcade crurale*=Crural arch. *Ligament de Cooper*=Cooper's ligament. *Pubis*=Pubis *Parois du sac*=Wall of the sac. *Contenu du sac*=Contents of the sac

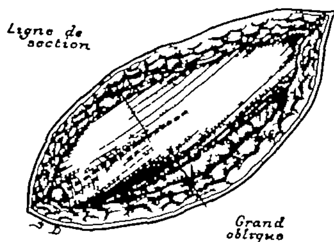


FIG 138.—FIRST STAGE.

The skin is incised at the level of the inguinal canal and the external oblique, and the external inguinal opening exposed. Line of division of the external oblique. In this and the succeeding figures the cutaneous incision has been exaggerated.

Ligne de section=Line of incision *Grand oblique*=External oblique

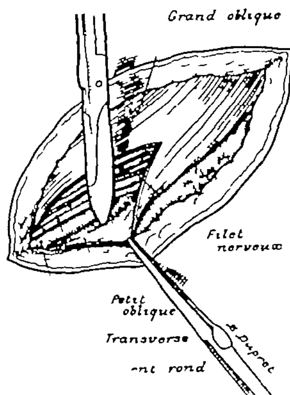


FIG 139 —FIRST STAGE.

The muscles of the abdominal wall are exposed beneath the upper lip of the external oblique The genito-crural nerve is seen. The deep surface of the lower lip of the external oblique is dissected as far as the crural arch.

Grand oblique=External oblique *Filet nerveux*=Nervous filament *Petit oblique*=Internal oblique *Transverse*=Transversalis *Ligament rond*=Round ligament

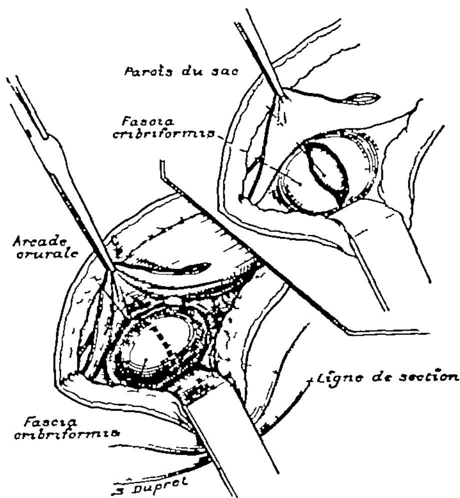


FIG 140.—SECOND STAGE.

The inferior lip of the external oblique is drawn above its superficial surface is separated as far as the arch from which the superficial fascia is detached. The retractor can then pull back the skin towards the thigh and bring to view the hernia covered by the cribriform fascia. Incision of this fascia.

Parois du sac=Wall of the sac. *Fascia cribriformis*=Cribriform fascia. *Arcade crurale*=Crural arch. *Ligne de section*=Line of incision

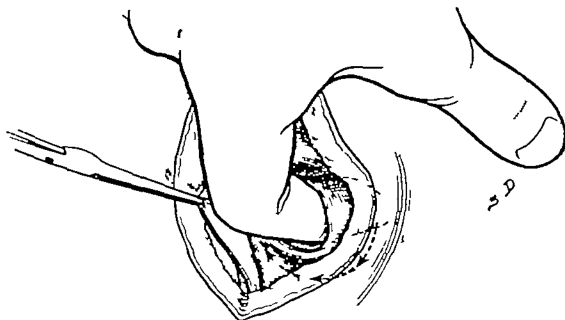


FIG 141.—SECOND STAGE.

The finger introduced into the opening in the cellular space beneath the aponeurosis passes round the hernia.

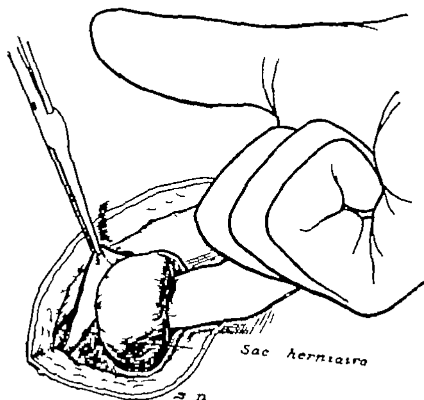


FIG. 142.—SECOND STAGE.
The finger introduced into the opening in the cellular space beneath the aponeurosis passes round the hernia and enucleates it from its bed.

Sac herniaire=Sac of the hernia

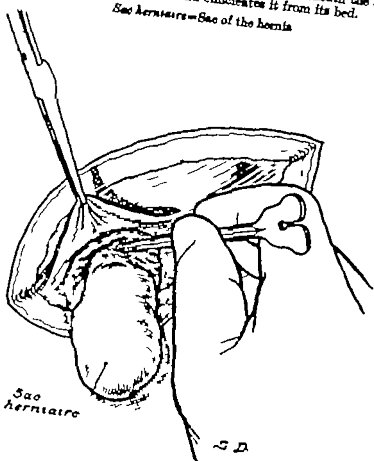


FIG. 143.—SECOND STAGE.
The sac has been stripped of all the cellular and fatty tissue. Its pedicle must be separated with care and dissected very high up as far as the crural arch. The femoral vein on the outer side must be avoided.

Sac herniaire=Sac of the hernia.

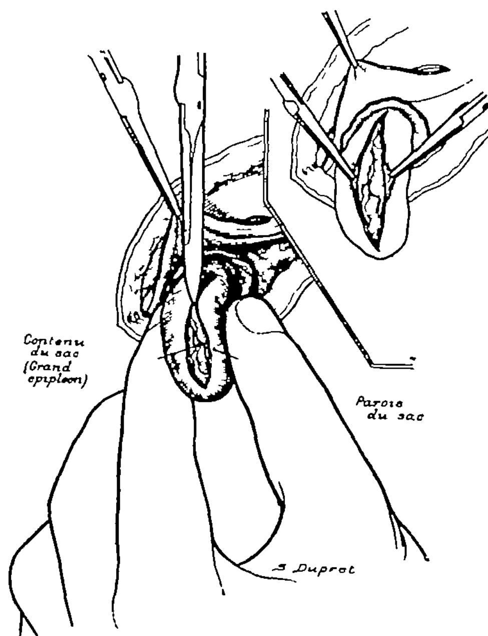


FIG 144.—SECOND STAGE.

Incision of the anterior wall of the sac to find out its contents; the incision should be carefully made if the presence of intestine be suspected. The edges of the incision should be marked out with forceps.

Contenu du sac (grand épiploon)—Contents of the sac (great omentum). *Parois du sac*—Wall of the sac

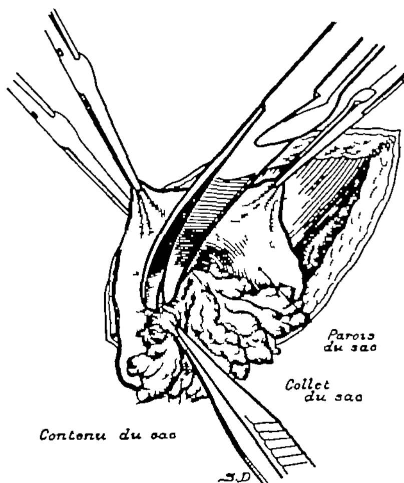


FIG 145.—SECOND STAGE.

The adherent omentum in the sac is widely separated as far as the neck.

Parois du sac=Wall of the sac *Collet du sac*=Neck of the sac *Contenu du sac*=Contents of the sac

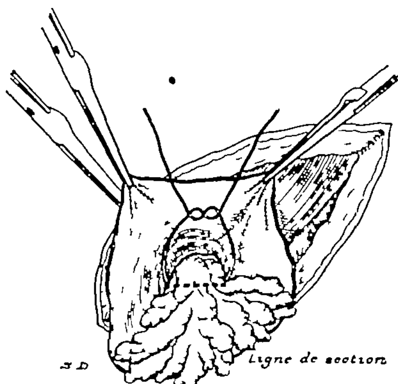


FIG. 146.—SECOND STAGE.

A provisional ligature is passed over the omental pedicle if the hernial mass be at all large: it is resected A large sac with much fat ought also to be partially resected in order to facilitate the further manipulations.

Ligne de sect o = Lin of incision

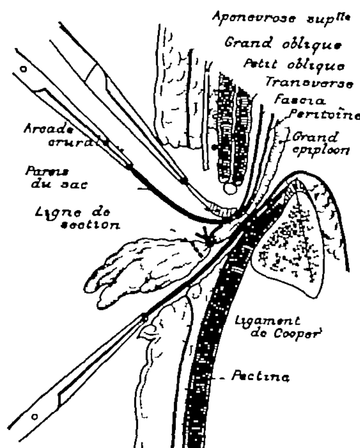


Fig. 147.—Second Stage.

Diagrammatic section showing this stage of the operation. The hernial sac is stretched by forceps beneath the crural arch; the tied omentum must be resected; above the ligature adhesions inaccessible by the femoral route persist.

Aponévrose supl^{le}.=Superficial aponeurosis. *Grand oblique*=External oblique. *Petit oblique*=Internal oblique. *Transverse*=Transversalis. *Fascia*=Fascia. *Péritoine*=Peritoneum. *Grand épiploon*=Great omentum. *Arcade crurale*=Crural arch. *Parois du sac*=Wall of the sac. *Ligne de section*=Line of incision. *Ligament de Cooper*=Cooper's ligament. *Pectiné*=Pectineus.

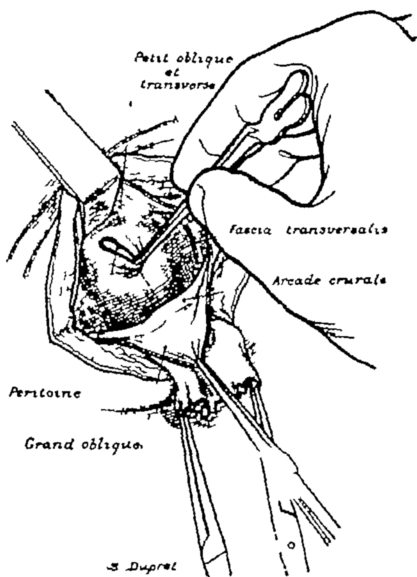


FIG 148.—THIRD STAGE.

The hernial sac is temporarily abandoned; the inferior lip of the external oblique is reflected towards the thigh a retractor pulls back above the muscles of the abdominal wall. The fascia transversalis appears in the bottom of the wound; it is opened by the grooved director opposite the pedicle of the hernia 2 centimetres above the crural arch.

Petit oblique et transverse=Internal oblique and transversalis *Arcade crurale*=Crural arch
Péritoine=Peritoneum *Grand oblique*=External oblique

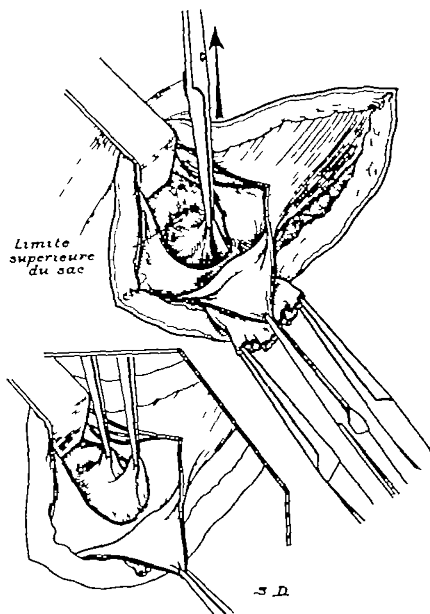


FIG. 149.—THIRD STAGE.

The fascia transversalis has been widely opened. In the soft subperitoneal fat forceps catch the pedicle of the sac and begin to draw it above; a second pair assist, and little by little the sac ascends through the crural opening. If the manipulation be difficult, it can be facilitated by pressing at the same time on the sac to reduce it into the abdomen.

Limite supérieure du sac=Upper limit of the sac.

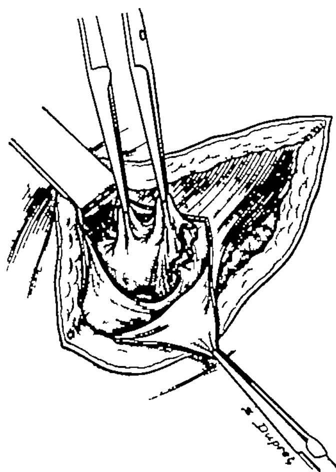


FIG. 150.—THIRD STAGE.
The sac has been completely brought into the inguinal region.

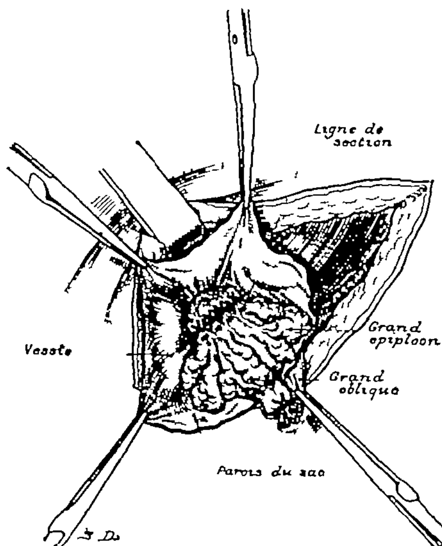


FIG. 151.—FOURTH STAGE.

The sac is extensively exposed by if need be, incising its anterior wall. The adhesions of the omentum to the pedicle or to the parietal peritoneum are freed with care as high as required. The permanent ligatures of the omentum are applied at a suitable spot and the *omentum is resected. Note the distance separating the permanent ligatures* of the omentum from the temporary ligature below the strangulation produced by the neck of sac.

Ligne de section=Line of incision. *Grand épiploon*=Great omentum *Vessie*=Bladder *Grand oblique*=External oblique *Parois du sac*=Wall of the sac

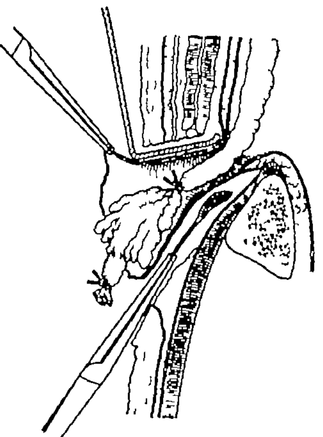


Fig 152.—Fourth Stage.

Section of the hernia at this stage of the operation. The sac is above the crural arch. The omentum is no longer adherent and could be drawn much more outside the abdomen if necessary

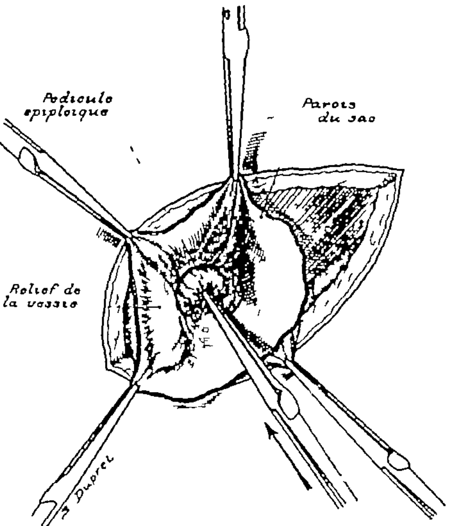


Fig 153.—Fourth Stage.

If the omental pedicle do not return by itself, it is pushed back into the abdomen. The sac is forcibly drawn upon by the forceps; the outline of the bladder is nearly always visible internally

Pédicule épiploïque = Omental pedicle *Parois du sac* = Wall of the sac.
Relief de la vessie = Outline of the bladder

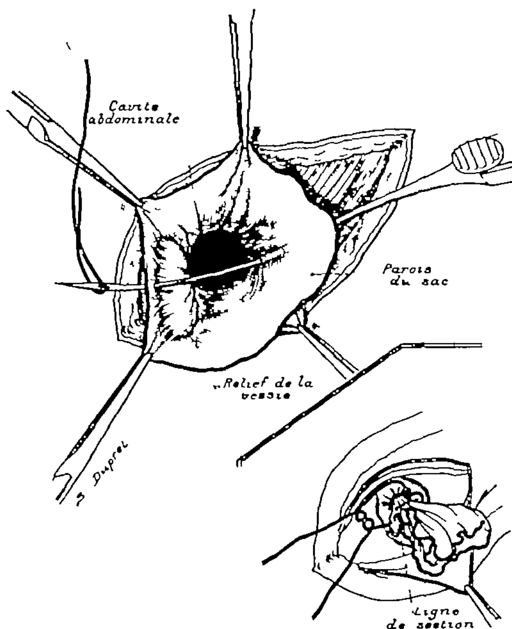


FIG 154.—FOURTH STAGE.

The pedicle of the sac being exactly separated on its external surface, a needle pierces it as high as possible, avoiding the bladder a thread is passed and knotted round the pedicle. The sac is resected.

Cavité abdominale=Abdominal cavity *Parois du sac*=Wall of the sac *Relief de la vessie*=Outline of the bladder *Ligne de section*=Line of incision.

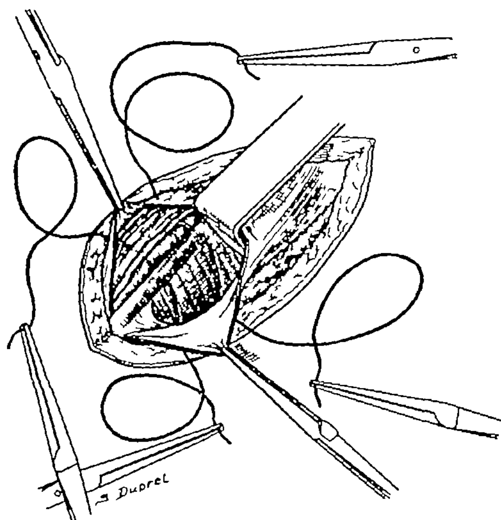


FIG 157 —FOURTH STAGE.

The upper ends of the two threads are then passed through the whole musculo-aponeurotic wall of the abdomen, surrounding the round ligament but leaving the genito-crural nerve outside.

The upper retractor has been removed.

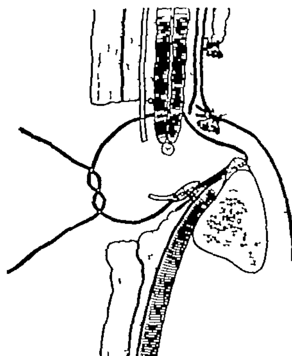


FIG 158.—FOURTH STAGE.
Section showing the arrangement of the loop of thread.

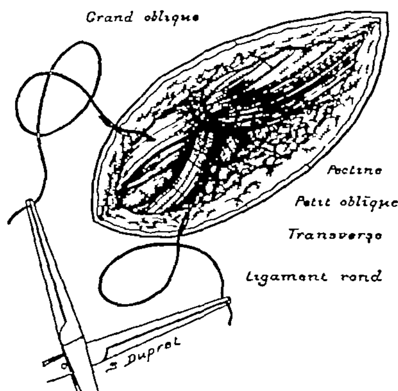


FIG 159 —FOURTH STAGE.
The external thread is to be tied first if it break it is very difficult to replace it. When it is tied the abdominal wall is markedly depressed and becomes united to Cooper's ligament.

Grand oblique=External oblique *Pectiné*=Pectineus *Petit oblique*=Internal oblique *Transverse*=Transversalis *Ligament rond*=Round ligament.

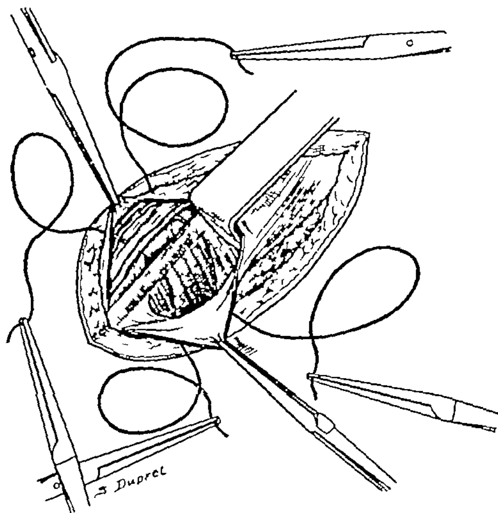


FIG 167 —FOURTH STAGE.

The upper ends of the two threads are then passed through the whole musculo-aponeurotic wall of the abdomen, surrounding the round ligament but leaving the genito-crural nerve outside

The upper retractor has been removed.

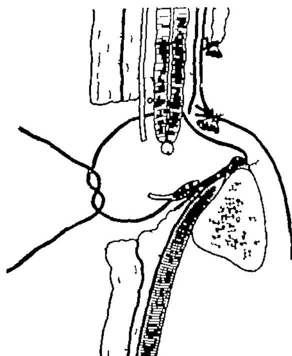


FIG 158.—FOURTH STAGE.
Section showing the arrangement of the loop of thread.

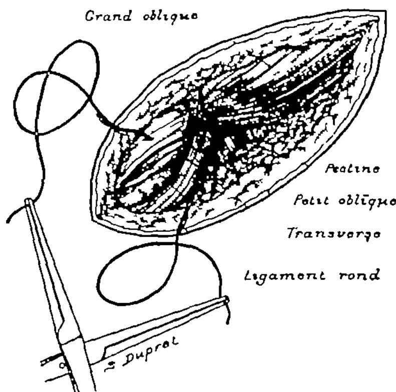


FIG 159.—FOURTH STAGE.
The external thread is to be tied first; if it break it is very difficult to replace it. When it is tied the abdominal wall is markedly depressed and becomes united to Cooper's ligament.

Grand oblique=External oblique *Pectiné*=Pectineus. *Petit oblique*=Internal oblique *Transverse*=Transversalis *Ligament rond*=Round ligament.

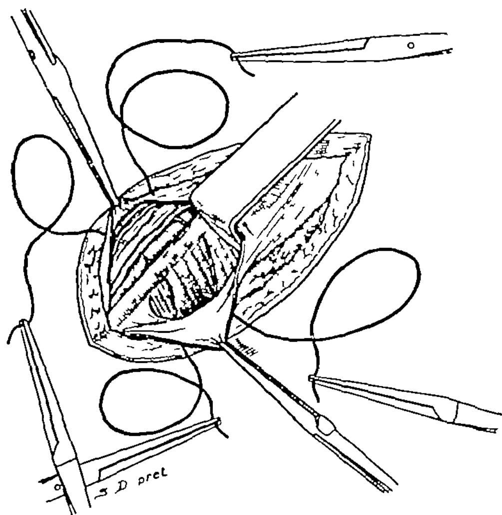


Fig. 157.—Fourth Stage.

The upper ends of the two threads are then passed through the whole musculo-aponeurotic wall of the abdomen, surrounding the round ligament but leaving the genito-crural nerve outside.

The upper retractor has been removed.

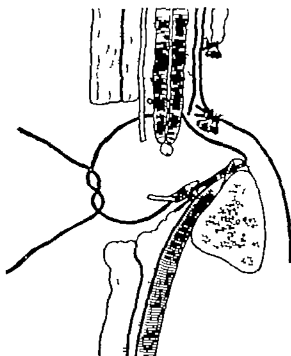


FIG 158 —FOURTH STAGE.
Section showing the arrangement of the loop of thread.

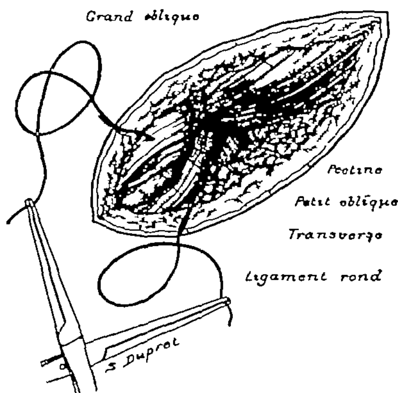


FIG. 159 —FOURTH STAGE.
The external thread is to be tied first if it break it is very difficult to replace it. When it is tied the abdominal wall is markedly depressed and becomes united to Cooper's ligament.

Grand oblique=External oblique *Pectinal*=Pectineus *Petit oblique*=Internal oblique *Transverse*=Transversalis *Ligament rond*=Round ligament.

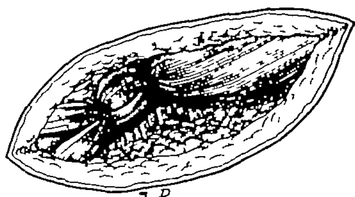


FIG 160.—FOURTH STAGE.

The internal thread is tightened. The wall is less depressed. On exploring with the finger there is no trace of the femoral opening the inguinal canal is also obliterated.

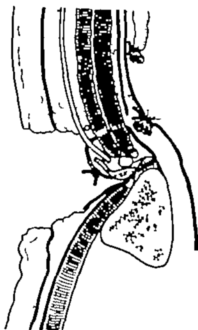


FIG 161.—FOURTH STAGE.

Section showing the result of tying the thread the crural arch and the abdominal muscles are united to Cooper s ligament.

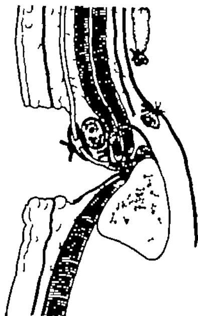


FIG 162.—RADICAL CURE OF FEMORAL HERNIA BY THE INGUINAL ROUTE IN THE MALE.

Section showing the two levels of suture avoiding the cord in the inguinal canal

XII

CALCULUS OF THE PELVIC URETER

CALCULUS of the pelvic ureter is a special surgical condition which must be studied independently of calculus of the kidney or of the upper part of the ureter Its causes, its symptoms, its evolution, its radiological appearance, its prognosis, and its treatment confer on it the characteristics of a special disease *

ETIOLOGY —Calculus of the pelvic ureter is a frequent condition which must be thought of in any patient who complains of persistent pains in the iliac fossa It should be considered in cases of chronic appendicitis, especially in those who still suffer after operation

A third of the cases of vesico ureteral calculus are due to calculus of the ureter *More than half of the cases of calculus of the ureter have their site in the pelvic portion between the normally con tracted point, where the ureter crosses the external iliac artery and the opening of the bladder*

It is probable that there exists a congenital anatomical predisposi tion, narrowness of the ureteral meatus favours it

SYMPTOMS—(a) *Passive Pain* —It is persistent and affects the patient at his work, it diminishes his physical capability and activity Acute attacks are not noticed but deep-seated dull, troublesome pains appear and disappear without cause they occur when the patient is sitting or standing up and rarely when he is lying down Rest in bed exercises a soothing influence especially in a position like a dog crouching

(b) *Active Pain* —It occurs after exercise or after a drive in a carriage or in an automobile etc Sometimes if the patient sit down in or rise up from a chair or armchair, he is compelled to support himself on the back or sides of the seat, in order to lessen the move ment and to facilitate rising Stooping down quickly in order to pick up something, starts the pain Massage of the left iliac fossa very often soothes it

* Cathelin, "Travaux annuels de l'Hôpital d'Urologie et de Chirurgie urinaire," fourth series Baillière, Paris, 1922

(c) *Pulsations of the Ureter* —The patient feels in the lower part of the ureter deep and painless pulsations which follow each other many times in succession.

(d) *The " Tete-à Tete " Sign* (Cathelin) *—It can be produced at will A painful attack in the iliac fossa can be produced in a sitting position by crossing the legs, it is probable that in this case the calculus is squeezed between the leg and the part of the psoas muscle which covers the true pelvis.

(e) *Hæmaturia* —It is rare, even after fatigue.

(f) *Pyuria* —It is also rare, because the stones are uratic or oxalic calculi, so that the urine remains aseptic. Sometimes secondary coli bacillary infection may arise, and this makes the urine cloudy

(g) *Renal Reaction* —At the onset the kidney is not affected, the successive deposits which produce the calculus can cause a true renal syndrome

(h) *Frequency of Micturition* —It is a common phenomenon, and occurs with moderate distension of the bladder

(i) *Importance of Position* —The mere fact of lying down and stretching the side opposite the affected one often produces dull pains.

(j) *Ureteral Catheterism* —This examination is not infallible, the catheter may pass at the side of the calculus.

A differential diagnosis ought to be made from appendicitis and from salpingitis, it should always be thought of in cases of chronic appendicitis, and a radiogram be demanded. With a painful syndrome in the right or left iliac fossa stone in the pelvic ureter should be thought of.

Radiographical Diagnosis—(a) *Examination of the Streak* —It is placed symmetrically on each side of the middle part of the upper inlet over the clear space of the sacro-iliac joint. When the stones are multiple they are arranged like a rosary

The size of the calculus generally varies from a millet seed to a nut but more often from that of a pea to a bean

(b) *Mistakes in Interpretation* —These are due to ossifications of the sacro-sciatic ligaments and calcification of the lymphatic or of the ilio-cæcal glands.

Progress —It is slow, and can last for years with constant pain which makes life hard to bear The condition may be bilateral

* French *signe du " Causeur "* (Translator)

whilst the patient suffers only on one side Rest in bed is the position which most often quietens the pain, bending the leg on the pelvis often produces a certain amount of alleviation

Prognosis —It is serious owing to the pains, and from threatened anuria, and from permanent irritation of the kidney which can end finally in cirrhosis

Calculi increase only slowly a calculus the size of a pea can, if the urine be not infected, take ten years to manifest its presence (Cathelin)

In contradistinction to small renal stones, a calculus of the pelvic ureter has little tendency to be eliminated, and to break the firm barrier represented by the meatus and by the vesical portion

Treatment —The only treatment is surgical Mobilisation of the stones by catheterism or a thermal cure has only a transitory and untrustworthy action It is better to have recourse to intervention as early as possible before the kidney is infected or atrophies Many routes of access are open

(A) **Subperitoneal Lumbo-iliac Route** —Spinal anæsthesia The bladder should be emptied

First Stage —The patient should be in the dependent position in two planes (side and dependent), in order that the abdomen and the side of the trunk may be explored The incision should start from the angle of the twelfth rib, and end near the middle line 4 centimetres above the pubis

Second Stage —Division of the muscles, of the aponeurosis, and of the fascia transversalis this incision should not include the rectus, which should be avoided

Third Stage —The peritoneum should be stripped with a compress mounted on forceps Doyen's large abdominal retractor should be introduced to expose the deep parts of the lumbar region

Fourth Stage —The epigastric vessels below should be divided, avoiding in men the vas deferens which is in the crossway of the vessels The pelvic cavity is well exposed

Fifth Stage —The ureter should be looked for, it is generally easily seen because it is distended as the annexed figures show if it be not visible, the bifurcation of the common iliac artery should be looked for the ureter is 1 centimetre outside It should be separated, and its sheath incised Close to the bladder it is lost in the vessels at the side of this organ and they should be avoided

SIXTH STAGE —The calculi should be looked for, and their site marked out, if it be situated low down, the operator should endeavour to do what the annexed figures show, the stones should be pressed from below upwards, which is sometimes difficult. The calculi should reach the lumbar portion of the canal, the ureter should be well protected by compresses, and then incised and sutured A suture is not absolutely necessary

(B) Transperitoneal Median Route — FIRST STAGE. — Spinal anæsthesia The patient should be placed in the dependent position, and an incision made from the umbilicus to the pubis The peritoneum is to be protected as in a gynæcological laparotomy

SECOND STAGE—*Exposure of the Ureter* —On the left, the iliac meso-colon should be incised and the colon afterwards pulled back internally, the ureter is exposed at the promontory and at the bifurcation of the common iliac artery The ureter passes 1 centimetre outside the bifurcation. On the right side, the ureter is also easily found, sometimes the cæcum has to be stripped of the parietal peritoneum. In the female, in order to expose the ureter, it is often necessary to cut the utero-ovarian ligament between two ligatures. The uterine artery is 2 centimetres from where the ureter crosses, and from the arterial bifurcation.

(C) Transvesical Route —This is applicable to cases where there is one small calculus immediately above the meatus It is necessary to make a very large opening in the bladder and to widen the meatus directly over the calculus This route is hardly to be recommended

(D) Endovesical Route.—It is employed in cases where the small calculus is impacted in the meatus By means of the cystoscope the meatus should be cauterised by the electro-cautery, so that a sphacelus at the end of the ureter is produced, the calculus passes into the bladder The operation is hardly to be recommended, as it can provoke secondary stenosis of the ureter, with elimination of the calculus.

(E) Vaginal Route —It is applicable to cases analogous to the two preceding methods—*i.e* where the calculus is impacted in the ureteral orifice The cervix uteri should be brought down by tissue forceps and by an antero-lateral incision into the vaginal fornix the peritoneal cul-de-sac which must be avoided is exposed The ureter should be looked for in the bladder The canal should be separated with a blunt instrument and incised

(F) **Perineal Route (Male)**—Woelcker's incision, as for lateral perineal prostatectomy, should be employed, a vertical incision parallel to the median line, outside the anus and the urethra The levator ani should be exposed and incised, examination made for the bladder and the prostate, and the ureter incised

To sum up, in cases of calculus of the pelvic ureter, try to bring the calculus to the lumbar part of the ureter by pressing it back, after either a lumbo iliac (the better) or median incision In cases where it is impossible to bring the calculus up and to enucleate it by the upper part of the wound, one of the following routes should be employed median, endovesical, transvesical, perineal, or vaginal, which routes are exceptional.

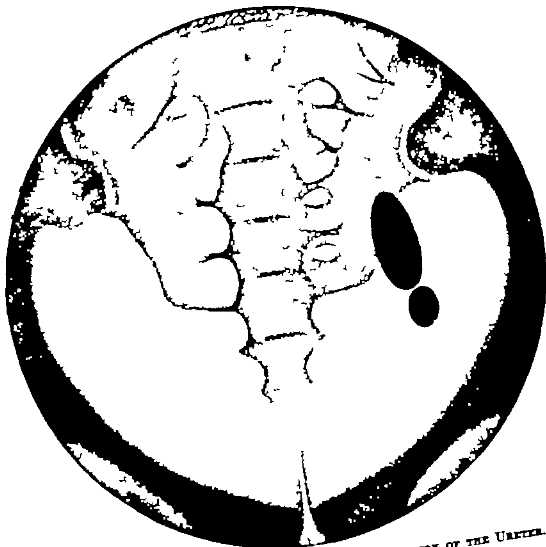


FIG. 163.—CALCULUS OF THE PELVIC URETER. INCISION OF THE URETER. Appearance of the calculi (Maingot's radiogram). The colon of the calculus has been darkened. Maingot in the report of the case states: There are two spots projected into the true pelvis, between the spine of the ischium and the bottom of the sacro-iliac articulation. The smaller is the lower is oval in shape, and measures about 1 centimetre in length and 7 to 8 millimetres in breadth; the larger one is adjacent to it and is situated immediately above it. It has the form of a date and measures about 4 centimetres in length and 1·6 centimetres in breadth. This spot consists of a dark central nucleus surrounded by a clear layer outside of which is a darker layer.

(The figures which follow indicate the operation.)

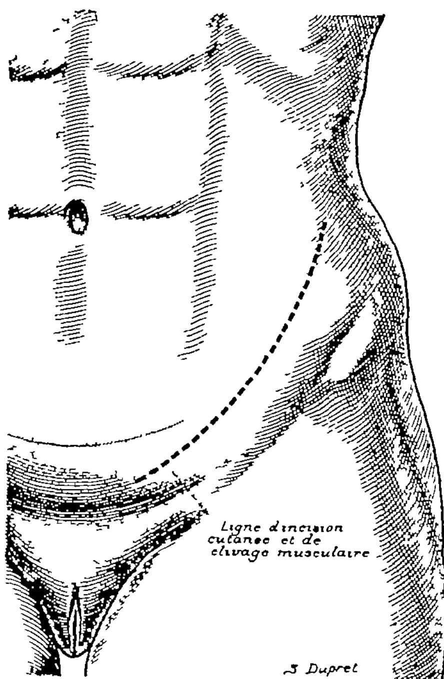


FIG 164.—CALCULUS OF THE PELVIC URETER. INCISION OF THE URETER.
Cutaneous incision.

Ligne d'incision cutanée et de clivage musculaire = Line of cutaneous incision and separation of the muscles

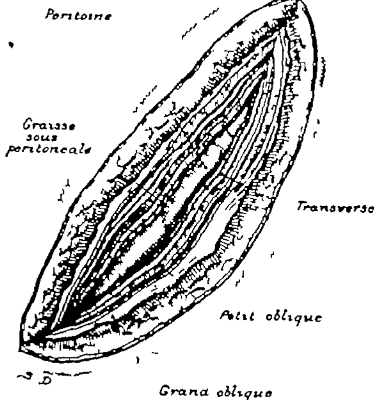


Fig 165.—Calculus of the Pelvic Ureter. Incision of the Ureter. *Division of the muscles and aponeuroses*

Péritoine = Peritoneum. *Graisse sous péritonéale* = Subperitoneal fat. *Transverse* = Transversalis *Petit oblique* = Internal oblique *Grand oblique* = External oblique

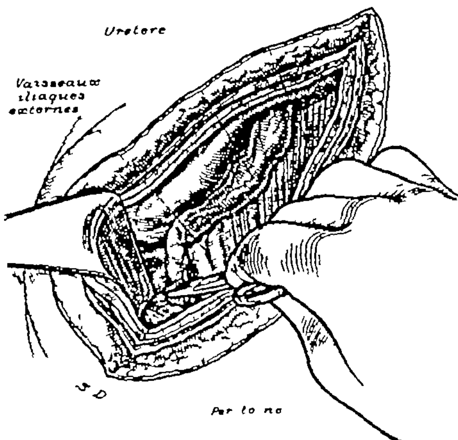


Fig. 166.—Calculus of the Pelvic Ureter. Incision of the Ureter. Exposure of the ureter which is distended like a loop of small intestine It is separated by means of a tampon on forceps. The vaginal retractor allows of exposure of the lower part of the ureter The ureter is seen to be dilated, but the calculi cannot yet be felt even with the tips of the fingers.

Psoas iliaque = Ilio psoas *Uretère* = Ureter *Vaisseaux iliaques externes* = External iliac vessels

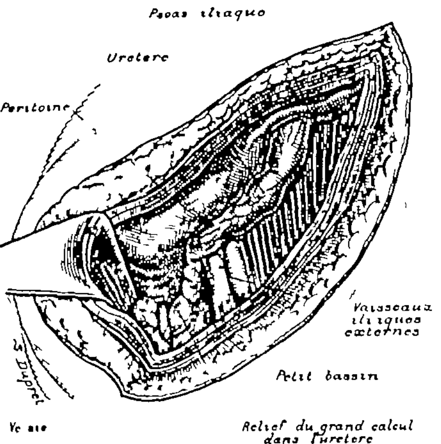


Fig 167 —Calculus of the Pelvic Ureter. Incision of the Ureter.

One of the two calculi is detected at the lower part of the wound. Two fingers are required to deliver so to speak, the calculus from the part of the ureter adjoining the bladder

Psoas iliaque=Ilio-psoas *Uretère*=Ureter *Péritoine*=Peritoneum *Vaisseaux iliaques externes*=External iliac vessels *Petit bassin*=True pelvis *Relief du grand calcul dans l'uretère*=Outline of the large calculus in the ureter *Vessie*=Bladder

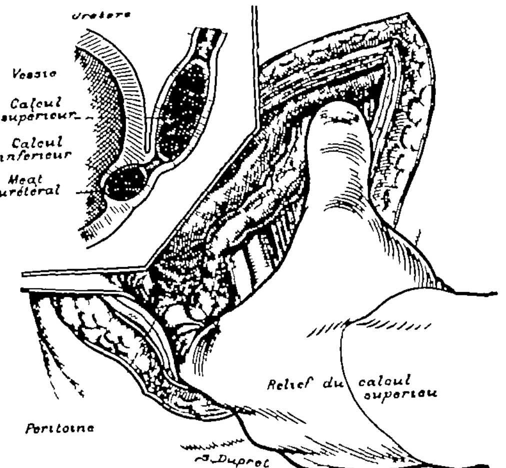


Fig 168 —Calculus of the Pelvic Ureter. Incision of the Ureter.

The operator begins by pushing back the upper calculus, and this is very easy The drawing above and on the left shows the position of the two calculi. The higher is removed with great ease; the lower on the contrary has to be enucleated by the fingers, like a cherry stone.

Uretère=Ureter *Vessie*=Bladder *Calcul supérieur*=Upper calculus *Calcul inférieur*=Lower calculus *Méat urétéral*=Meatus of the ureter *Relief du calcul supérieur*=Outline of the upper calculus *Péritoine*=Peritoneum

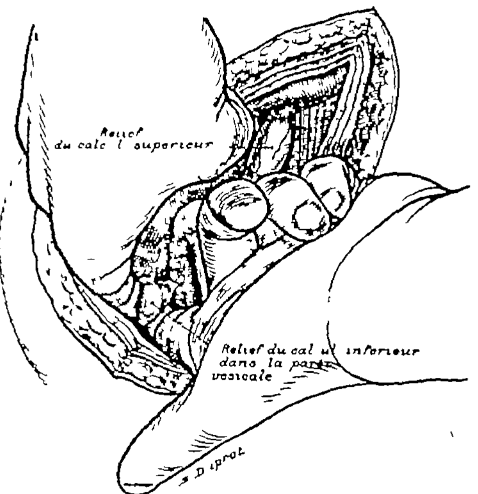


Fig. 169.—Calculus of the Pelvic Ureter. Incision of the Ureter.

The operator recognises the lower calculus, immediately below the upper one. The latter is close to the bladder

Relief du calcul supérieur=Outline of the upper calculus *Relief du calcul inférieur dans la paroi vésicale*=Outline of the lower calculus in the wall of the bladder

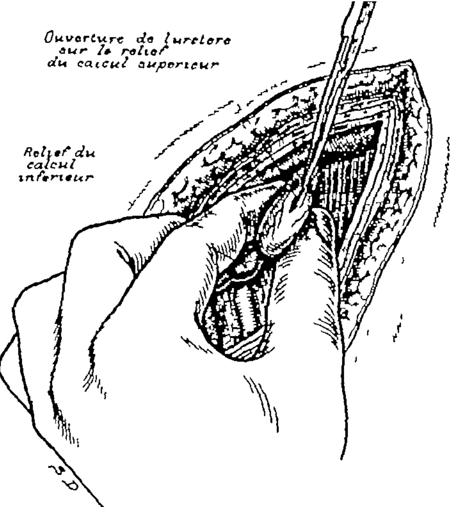


Fig. 170.—Calculus of the Pelvic Ureter. Incision of the Ureter.

Incision of the ureter over the prominence made by the larger calculus. The smaller one follows the same route quite easily

Ouverture de l'uretère sur le relief du calcul supérieur=Opening the ureter over the outline of the upper calculus. *Relief du calcul inférieur*=Outline of the lower calculus.

Surjet non perforant
Uretere
Sonde filiforme
Vessie
Uretre
Dupret
Uretere

FIG. 171.—CALCULUS OF THE PELVIC URETER. INCISION OF THE URETER.
Suture of the ureter with slowly absorbable catgut 00, with non-perforating stitches. The bougie is not fixed in. Immediate union has been obtained.

Surjet non perforant=Non perforating continuous suture *Uretère*=Ureter *Sonde filiform*=Filiform bougie *Vessie*=Bladder *Urètre*=Urethra.





FIG 172.—CALCULUS OF THE PELVIC URETER. INCISION OF THE URETER.
Appearance of the two calculi removed (natural size).

XIII

TREATMENT OF MARKED PROLAPSE OF THE GENITAL ORGANS WITH EXTENSIVE CYSTOCELE

Anterior Tilting of the Uterus with Suture of the Round Ligaments to the Levatores Ani

By J ABADIE (D ORAN)

Principles —Re-formation of the posterior wall of the perinæum by the production of a solid spur between the vagina and the rectum, is the essential stage of the whole surgical cure of prolapse of the genitals. It is the key to the arch.

It is alone sufficient in prolapse from traumatic laceration of the perinæum, or from weakness and progressive laxity of the different supports to the uterus and to the vagina, on the one condition that the anterior wall of the perinæum is not weak. When the latter exists, and when there is a cystocele, anterior colporrhaphy is obviously futile, there can be no permanency if the wall be elastic and can again be quickly distended. A diminution of the enlarged anterior vaginal wall is only a *correction of the effect, without troubling* about the cause

The idea that guided Delanglade, Groves, and Chaput when they recommended anterior suture of the levatores ani was to interpose between the bladder and the vagina a resistant level of perinæum capable of supporting abdominal tension Unfortunately it is too often impossible or inefficient, because the levatores ani are too far away to be apposed or too feeble to hold, the threads only bring together the frayed flaps and torn fibres, even if care be taken as Souberran has proposed, to charge the aponeurosis with the muscle, which by this means doubles the upper wall

In these cases—and they are many—what is to be done ? Obliteration of the vagina (Le Fort Müller) ? In many cases this question is quickly answered.

To make plastic use of the uterus, by tilting it under the bladder ?

Schauta, Le Dentu and Pichevin place the uterus outside the vagina, between its anterior wall and the bladder Wertheim, in his

initial operation, left the body of the uterus entirely exposed in the vagina, sutured to the latter by its anterior surface, the summit below All these observers discard anterior colpotomy, Freund also makes use entirely of posterior colpotomy, tilting the uterus and suturing it to the vaginal walls, not only in front but also behind

One criticism may be levelled against these methods the size of the uterus is only made use of, as a more or less large cork, which is exposed in the vagina like a fixed pessary, or shelters itself behind the illusory support of the anterior vaginal wall, which *is only too* ready to expand

But no attempt is made to make an anterior perineal plane

That is why, in order to push the bladder up and, at the same time, to re-make in its whole extent a thick and firm anterior perinæum, I have proposed anterior tilting of the uterus with suture of the round ligaments to the levatores ani.*

As a coal heaver rests his shoulders or arms on two resistant supports and leans forwards to receive on his back the burden he has to carry when he has straightened himself, so the uterus, tilted and united by its cornua to the anterior borders of the levatores, supports on its back the bladder which it pushes up

Let us repeat, then, reconstitution of the posterior ought always to be combined with re formation of the anterior perinæum.

Indications.—The following is the typical indication genital prolapse with slight or marked cystocele, in a woman who has reached or passed the menopause.

Are the seriousness of the prolapse, the permanent protrusion of the uterus completely outside, and the co-existence of a rectocele even a large one, contra indications? Not at all for with total procidentia which some surgeons find an indication for hysterectomy (often, in our opinion *insufficient*), we have *obtained good* and permanent results.

On the other hand, how are the cases to be recognised in which the operation of Delanglade—Groves—Chaput will be satisfactory? Stretch the levatores by drawing behind with a retractor on the perinæum, and ask the patient to contract his abdominal muscles. If the index finger introduced into the vagina only catch a narrow muscular band scarcely distinguishable from the ischio-pubic ramus, if between one band and another the finger note a large space it is

* *Archives mensuelles d'obstétrique et gynécologie*, décembre 1912.—*Bulletins et mémoires de la Société de chirurgie* 1912, p 1316—2e *Congrès Français de Chirurgie* 1913 p 341

useless to count upon anterior suture of the levatores, the ligatures will not hold or catch anything

Is youthful age a contra indication? Not if the seriousness of the prolapse make pregnancy impossible or dangerous in any way and with any operation. It is a question of the case and of good sense In these cases, be the patient far from or near the menopause, it is easy during the operation, when the uterus has been tilted in front, and the uterine cornua are reached, to place one or two permanent ligatures at the origin of the tubes

The co-existence of non inflammatory lesions of the adnexa, such as slightly large, solid, or cystic tumours of variable size, ought not to forbid the operation we will describe, by means of de Ott's electric speculum (or even without it) the exact appearance and connections of these tumours can be verified, and they can be caught by the peritoneal opening already made for tilting the uterus in front We have had the opportunity of carrying out the following procedure (see Fig 182)

Preparatory Precautions —The cervix uteri is often hypertrophied, gaping, infected, and ulcerated. The ulcerations may spread and exist with ulcerations of the vaginal walls

The *ulcerations ought to be rendered aseptic.* *In order to make* the neighbouring tissues supple we have found continuous applications for some days of sterilised vaseline compresses of value

The hypertrophied cervix should be previously amputated or altered by cauterisation Sometimes the uterine cavity must be curetted. These precautions should preferably be taken in advance the discharges which flow from the uterus or from the incised cervix can easily infect the lines of suture especially those required for the eventual restoration of the posterior perinæum.

In every case if amputation of the cervix and anterior tilting of the uterus be performed at the same time it is wiser to put off the operation of posterior colpoperineorrhaphy until a later date, or abstain, whilst carrying it out, from any colpectomy which would leave a line of suture on the posterior wall of the vagina

It is obviously better to be freed at once of an amputation of the cervix, which can be performed under local anæsthesia, and then at a second stage to re-form both the anterior and the posterior perinæum

Technique—ANÆSTHESIA —We remain faithful to spinal anæsthesia, with 0·04 gr stovaine, preceded three hours before by a subcutaneous injection of caffeine * If the analgesia be of insufficient duration (the operation sometimes lasts more than three-quarters of an hour in complicated cases), the return of sensibility hardly ever occurs, except during the reconstitution of the posterior perinæum, and it is then sufficient to give a little ether or ethyl chloride

Position —Gynæcological or lithotomy, with the perinæum well exposed by markedly flexing the thighs on the pelvis, with the body slightly dependent

Stages of the Operation —Refer to the Figs 176 to 186, the notes of which replace a text which would only be a repetition

Formation of the Posterior Perinæum —In cases of severe prolapse, with a posterior colpocele it is often necessary to perform a colpectomy, which may be extensive, with the formation of the posterior perineal spur

In some cases, again, the stage of anterior re formation has to overlap in some degree that of posterior colpoperineorrhaphy Here, for instance, is what we were obliged to do in one of our cases before retracting the cervix, we passed on to the second part of the operation, posterior colpoperineorrhaphy with a very large colpectomy, and then extensive apposition of the levatores with chromic catgut strengthened by silver wire which included all the tissues between the vagina and the rectum Before twisting the wire, half the length of the incisions of the anterior colpectomy was sutured, and the whole of those of the posterior colpectomy, in this way, accordingly, reforming the vagina and retracting the cervix uteri. The anterior tilting was then obtained by suturing the round ligaments to the levator and closing the vaginal wound The posterior silver wire was then tied (Obs. VII No 2643)

Although isolation and apposition of the levatores and then closure of the skin (taking care to elongate the perinæum between the fourchette and the anus) give satisfaction in the anatomical neatness of the operation for reconstituting the posterior perinæum, we think the wound is firmer by regularly including in the through and through sutures (silver wire or silkworm gut) all the levels of the perinæum taking care to ligature half the thickness of the posterior vaginal wall in order to avoid any dead space

Dressing —Fix in a sound, insert gauze into the vagina and apply a dressing to the vulva

* *Bull. et Mém de la Société de chirurgie* 1922 p 810 and *Presse Médicale* 13 sept. 1922

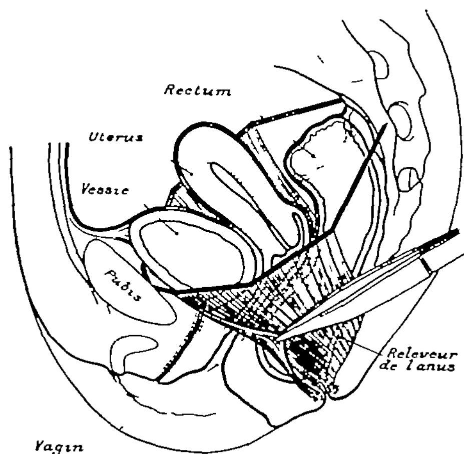


FIG 173.

Normal arrangement of the pelvic organs in the centre of the interrupted diaphragm formed by the levatores ani. The upper line of insertion is drawn in perspective the direction of the fibres is indicated forceps turn back the anterior band in order to show it better

Rectum=Rectum *Utérus*=Uterus *Vessie*=Bladder *Pubis*=Pubis *Releveur de l'anus*=Levator ani. *Vagin*=Vagina.

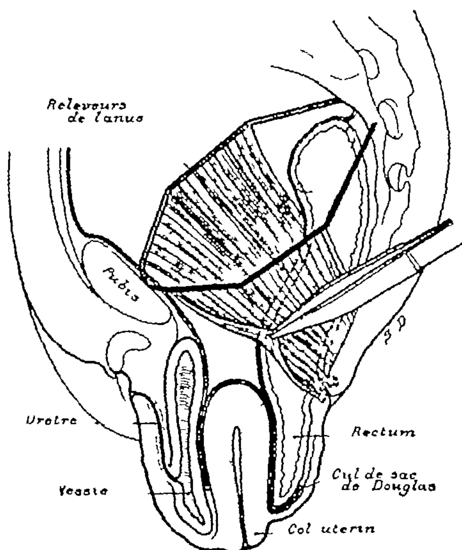


FIG. 174 —COMPLETE GENITAL PROLAPSE.

The mass of the bladder and of the uterus has escaped and fallen between the anterior fibres of the thinned and separated levator

Releveurs de l'anus = Levatores ani *Pubis* = Pubes *Urètre* = Urethra *Rectum* = Rectum
Cul-de-sac de Douglas = Douglas pouch *Vessie* = Bladder *Col utérin* = Cervix uteri.

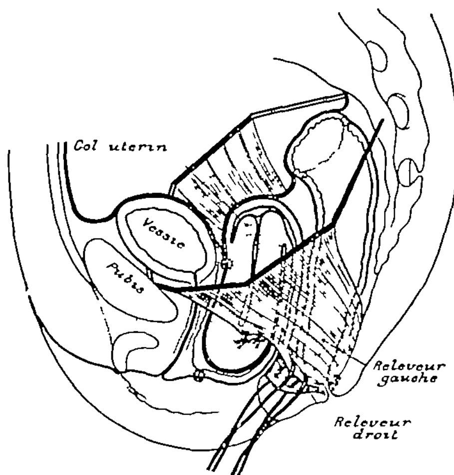


FIG 175.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

Result of anterior tilting of the uterus maintained by attaching the origin of the round ligaments to the upper part of the anterior fibres of the levatores. The reflection of the posterior perineum is taking place the sutures pierce the posterior wall of the levatores which they interpose between the rectum and vagina drawn in front. Note the suture of the peritoneum above the bladder to the peritoneum of the posterior surface of the tilted uterus.

Col utérus—Cervix uteri. *Vessie*—Bladder *Pubis*—Pubis *Releveur gauche*—Left levator *Releveur droit*—Right levator

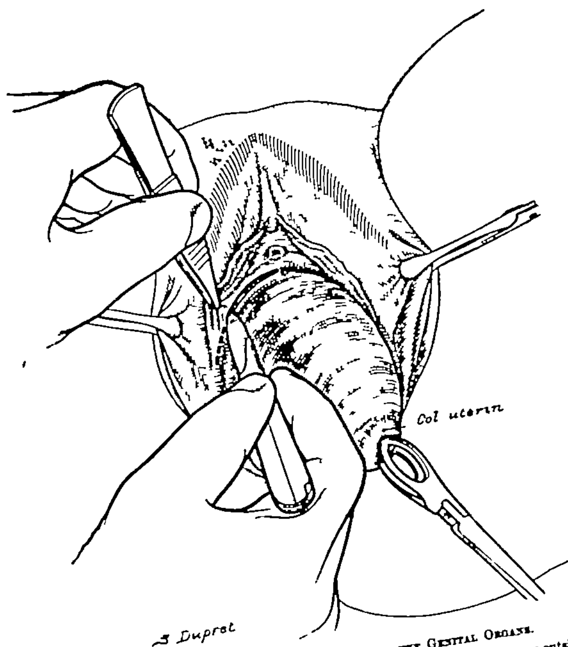


FIG 176.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

The labia majora being separated by two forceps, forceps below draw the uterus outside and bring it down as much as possible to the left in order to expose well the right reflected angle of the anterior vaginal wall. An incision 4 to 5 centimetres long is made about 1 centimetre internal to the ischio-pubic ramus, which is felt by the finger

Col utérin=Cervix uteri.

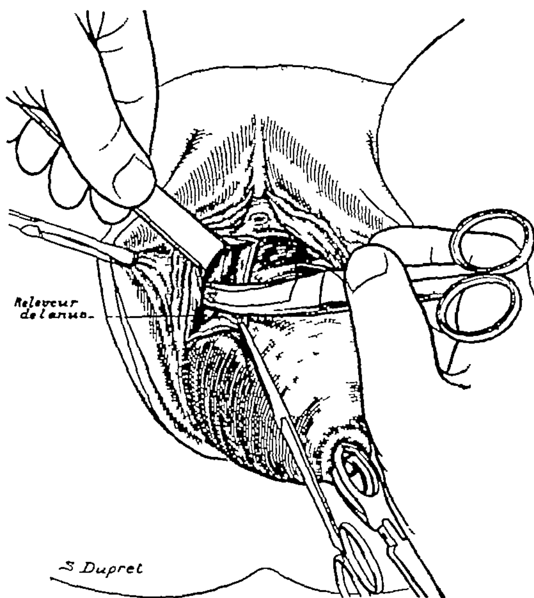


FIG. 177.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

The deep internal surface of the levator is marked out and separated by the blunt point of curved scissors, which keep close to the side of the uterus. A second pair of scissors does the same to the external surface.

Releveur de l'anus=Levator ani.

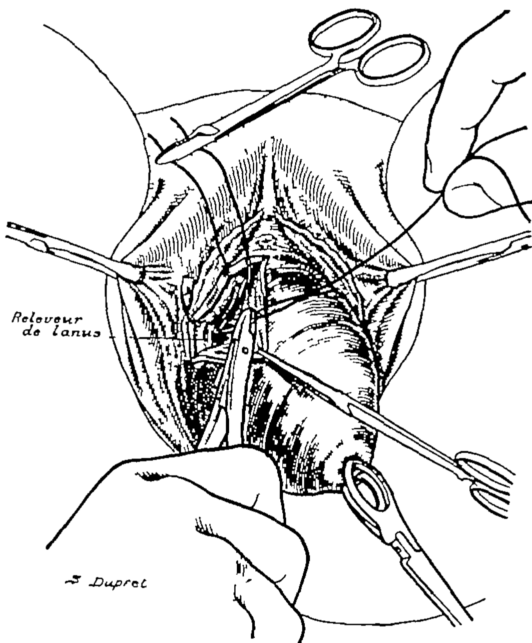


FIG 178.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

The needle easily passes two threads through the muscular fibres. It is wise to mark out each thread by forceps, and not to mistake later on the chief ones, and to catch them so that, for example, the chief internal one is nearer the joint of the forceps. Throw the forceps back on to the pubis or hook it by its bill to the towel sufficiently far away as to cause no inconvenience. We use silkworm gut (The venous spaces sometimes bleed a little, but need cause no anxiety Separation of the levator and the passage of the threads are all the more easy the quicker one proceeds before bleeding can cause any *inconvenience.*)

Releveur de l'anus = Levator ani.

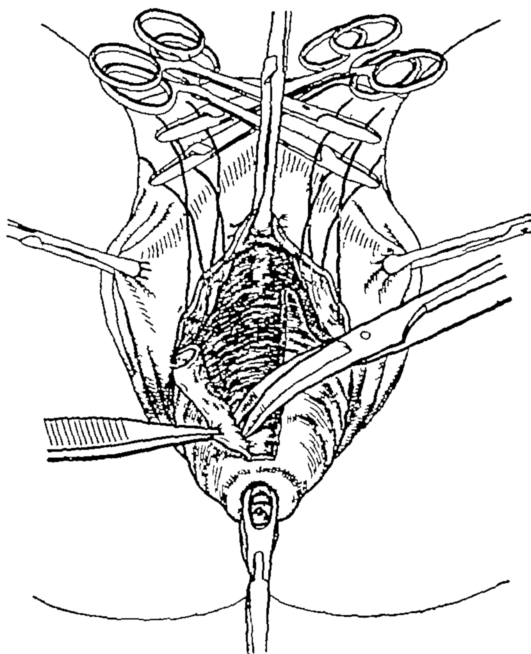


FIG 179.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

The same manipulations having been performed on the left side, and the two incisions apposed following a line passing slightly behind the meatus, the time has arrived to mark out on the anterior vaginal wall the band which will be dissected behind the urethra, the bladder being carefully avoided. It is not wise to perform at once a large colpectomy but *at the same time sufficient tissue should be preserved to cover the* tilted uterus (see Fig. 186). In this drawing colpectomy being accomplished, the lateral lips are dissected in order to make easier in due course separation of the bladder and of the uterus, and to leave on the sides sufficient room for the tilted uterus.

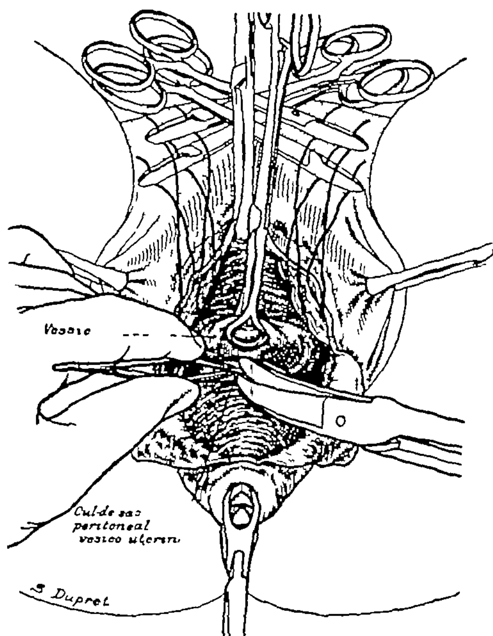


Fig. 180.—Treatment of Prolapse of the Genital Organs.

Passing round the bladder between it and the uterus (the only stage which is really difficult) its fundus is raised so as to reach the peritoneal cul-de-sac It is here marked out, seized, and ready to be opened with scissors.

Vessie = Bladder *Cul-de-sac péritonéal (vésico-utérin)* = Peritoneal cul-de-sac between the bladder and the uterus

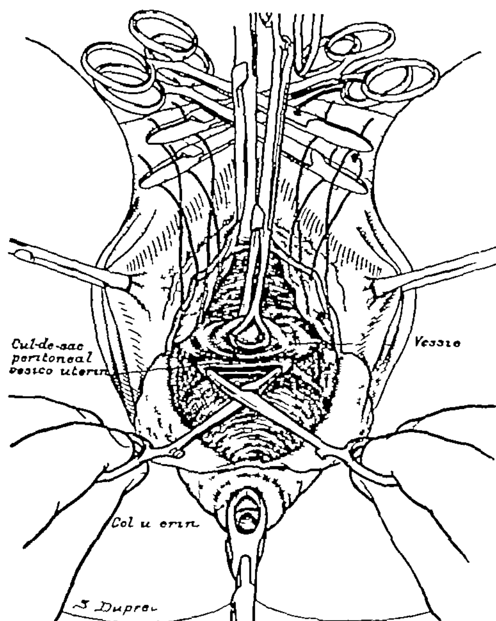


Fig. 181.—Treatment of Prolapse of the Genital Organs.

The peritoneal cul-de-sac having been opened by scissors, the opening is enlarged by with drawing an open pair of forceps. The upper lip should be marked out.

Vessie = Bladder *Cul-de-sac péritonéal vésico-utérin* = Peritoneal cul-de-sac between the bladder and the uterus *Col utérin* = Cervix uteri.

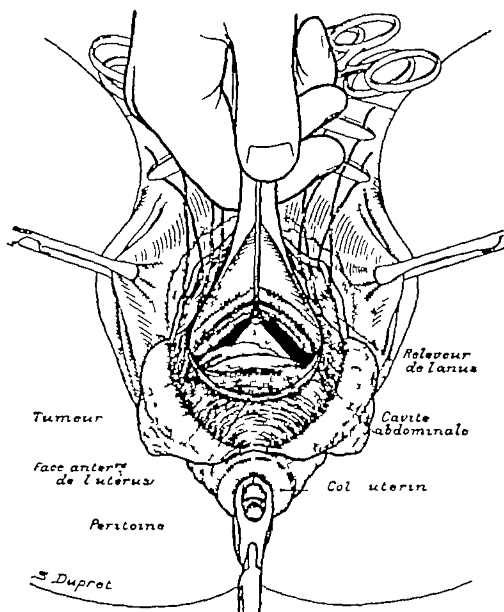


FIG 182.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

Exploration of the uterus and the adnexa. Generally two fingers introduced into the peritoneal opening are sufficient. In some cases it is advantageous to make the exploration clearer by introducing de Ott's electric retractor (in this case, to tilt the patient more in the dependent position, in order to empty the pelvis of the intestinal loops)

Releveur de l'anus=Levator ani. *Tumeur*=Tumour *Cavité abdominale*=Abdominal cavity *Face antére. de l'utérus*=Anterior surface of the uterus *Col utérin*=Cervix uteri. *Péritoine*=Peritoneum

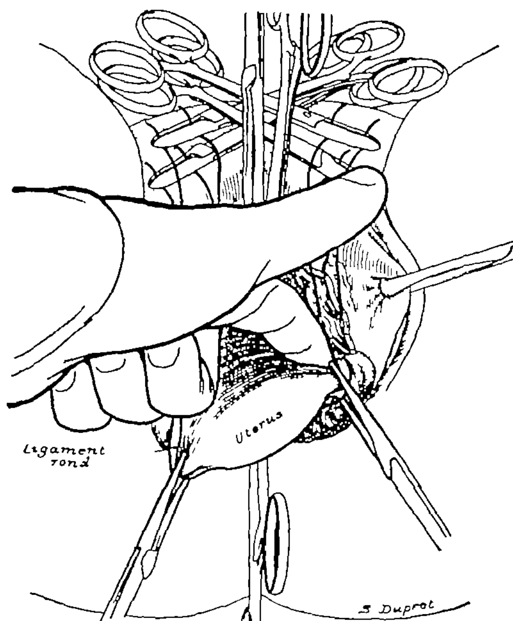


FIG. 183.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

Tilting the uterus outside there is nothing more easy if it be small. If it be large, one of the angles should be attacked the index finger hooks one of the uterine cornua and brings it forward, and forceps immediately seize it; the same manœuvre should then be carried out on the other side. In some cases (the finger being too short to pass the cornua even although traction be exercised on the uterus) it is necessary to seize, step by step, the anterior surface of the uterus, from the neck to the fundus, by catching hold of it bit by bit with Faure's flat forceps. Directly the fundus is caught, the cervix is to be pushed into the bottom of the vagina.

Ligament rond = Round ligament. *Uterus* = Uterus

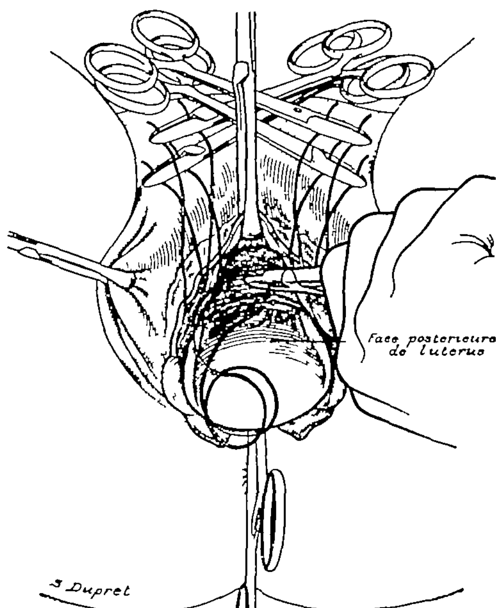


FIG 184 —TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

The uterus has been tilted forwards. The upper lip of the peritoneum is sutured to the posterior surface of the uterus. The abdominal cavity is thus closed.

N.B.—Any existing lesions of the adnexa should be treated before the suture is applied, such as puncture of a cystic ovary accouchement externally removal, return of the stump, ligature, etc. After closure of the peritoneum, if the patient be not at the menopause, each tube should be strangled near its origin by a non-absorbable ligature.

Face postérieure de l'utérus=Posterior surface of the uterus

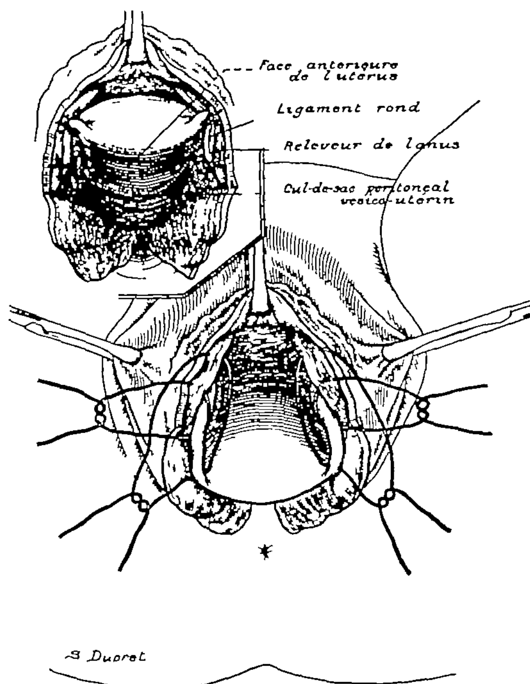


FIG 185.—TREATMENT OF PROLAPSE OF THE GENITAL ORGANS.

Catching hold of each of the ligatures inserted into the levatores and marked out in the way we have stated, the chief internal ones are passed methodically under the corresponding round ligaments, so that the one nearest to the symphysis pubis is farthest from the uterine cornu.

Face antérieure de l'utérus=Anterior surface of the uterus *Ligament rond*=Round ligament *Releveur de l'anus*=Levator ani. *Cul-de-sac péritonéal vésico-utérin*=Peritoneal cul-de-sac between the bladder and the uterus

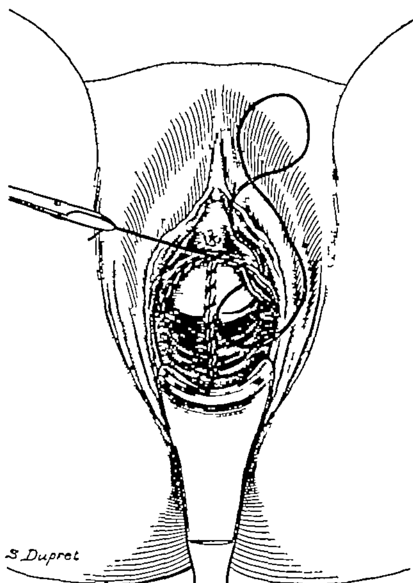


Fig. 186—Treatment of Prolapse of the Genital Organs.

The ligatures being knotted, the round ligaments are therefore fixed to the levatores, and the body of the uterus ascends slightly. The suture whilst increasing at this moment the extent of the colpectomy should be applied so as to keep only what is necessary to cover the uterus and to make an exact apposition.

XIV

CANCER OF THE CERVIX UTERI

Extensive Vaginal Hysterectomy (Schauta's Method)

EVERY case of cancer of the cervix uteri, operable owing to the slight extent of the lesions* and to the general state of the patient should be removed as widely and as early as possible

If the woman be thin or moderately fat, and not too old, Wertheim's operation (abdominal hysterectomy) should be performed in the way described by J L Faure in Volume II

If the patient be stout, old weak or otherwise diseased, if for some reason or other abdominal hysterectomy, and especially the injurious effect of the dependent position on the heart, be feared a vaginal hysterectomy should be undertaken, as this can be performed in the horizontal position, and is always a mild operation

When the vagina is large it need not be made larger by dissection. If, as there usually is, there be not sufficient space Cunéo's perineal hysterectomy should be performed, as described in Volume V, or else Schauta's method, which the reader will understand by the annexed figures, especially if he run over the chapter in Volume V on perineal hysterectomy and also the chapter in Volume I dealing with the treatment of vesico-vaginal fistulæ

In every weak patient the indications which we have advanced on perineal hysterectomy apply equally to Schauta's operation of vaginal hysterectomy but with the difference that it is possible to perform the latter with a narrower vagina The space which it gives is, however, more extensive than that obtained by the perineal opening On the other hand the latter heals more easily and more quickly Each of these methods, then has its indications

We proceed as follows

PREPARATION (as for Perineal Hysterectomy) —The cervix should be disinfected by curetting by cauterisation, or by radium

ANÆSTHESIA—*Spinal or Trans Sacral*

TECHNIQUE—(*a*) *Separation of the Vulva and of the Vagina* —It should be made on the right or on the left side, preferably to the

* See drawings, Vol II. "Treatment of Cancer of the Cervix Uteri."

right of the operator outside the middle line The vagina, the vulva, the skin of the ischio rectal fossa, should be attacked and the levator ani cut The dissection should go more or less deeply, according to the space the operator requires, otherwise both sides will have to be incised, and this is nearly always unnecessary We have never had to do it

The vagina should be incised at its lower half, the vulvar orifice should be cut close to the fourchette

(*b*) *Circular incision of the vagina* about the middle, but this depends on the infiltration of the vagina The incision should be made about 3 centimetres below the part infiltrated with the growth, so that the vagina is divided in healthy tissue

(*c*) *Separation of the Vagina* —The vagina is dissected from the rectum and from the bladder, up to the isthmus of the uterus

(*d*) *Closure of the Vagina* —A compress soaked in ether or in iodine should be introduced in the vaginal fornix, which should be sutured below the compress

(*e*) *Ligature of the uterine artery,* which should be well isolated

(*f*) *Opening of the peritoneal culs-de sac,* anterior and posterior

(*g*) *Division of the Broad Ligaments* —They should be divided beyond the adnexa, but if there be any difficulty in making a pedicle to the latter, the ligaments should be divided between the uterus and the adnexa

(*h*) *The adnexa being firmly caught by forceps, should be tightly ligatured* with strong slowly absorbable catgut, or by silk.

(*i*) *Closure of the Peritoneum* —This should be incomplete, at the right and left extremities of each side of the transverse suture, the stumps of the broad ligaments should emerge

(*j*) *The stumps of the broad ligaments should be tied together,* so that they raise the peritoneal suture which occupies the bottom of the vagina

(*k*) *Closure of the floor of the vagina* (transverse opening) by some interrupted stitches

(*l*) *Suture* of the vertical wall of the vagina, of the levator ani, of the fatty tissue, and of the skin

Collargol ointment 15 per cent should be used as a dressing

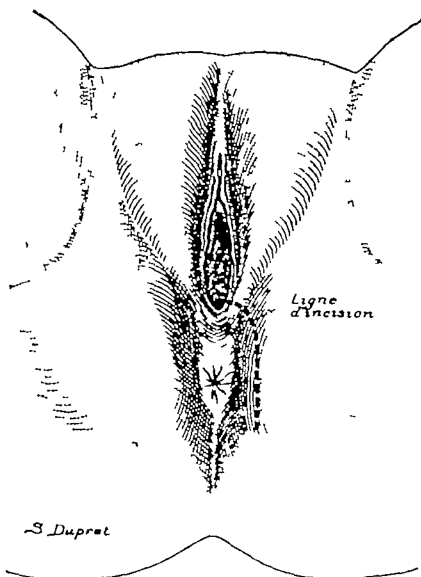


FIG. 187.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI

Line of the cutaneous and mucous incision. It opens the vulva at the right of the fourchette, the lower half of the vagina, and cuts the skin parallel to the median line to a spot often lower than the anus. The length of the cutaneous incision should be proportionate to the stoutness of the patient and to the necessity for enlarging the vagina more or less.

Ligne d'incision—Line of incision

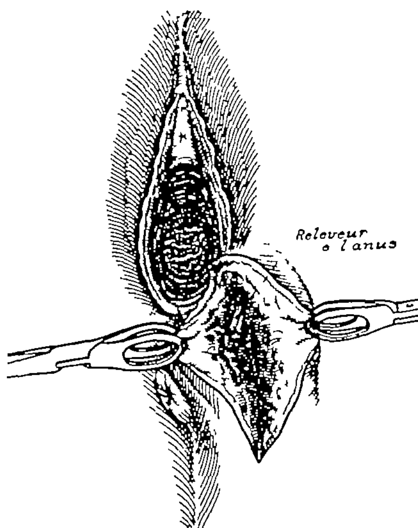


FIG 188.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI. Incision of the vulva and of the vagina. The levator ani will be divided.

Releveur de l'anus=Levator ani

Fig. 189.—Extensive Vaginal Hysterectomy for Cancer of the Cervix Uteri.

The levator ani has been divided and bleeding of the fatty tissue stopped.

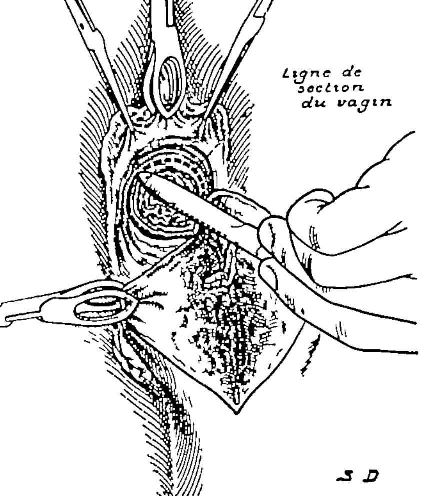


Fig 190.—Extensive Vaginal Hysterectomy for Cancer of the Cervix Uteri.

Circular incision of the vagina 3 centimetres below the lesions, at the limit of the vertical incision of the vagina; the incision includes the whole vaginal wall and avoids the rectum and the bladder

Ligne de section du vagin—Line of division of the vagina.

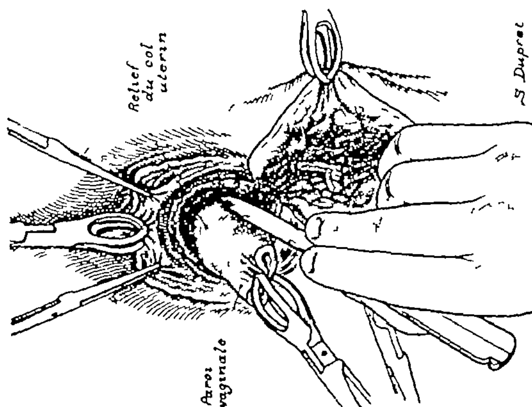


FIG. 101.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

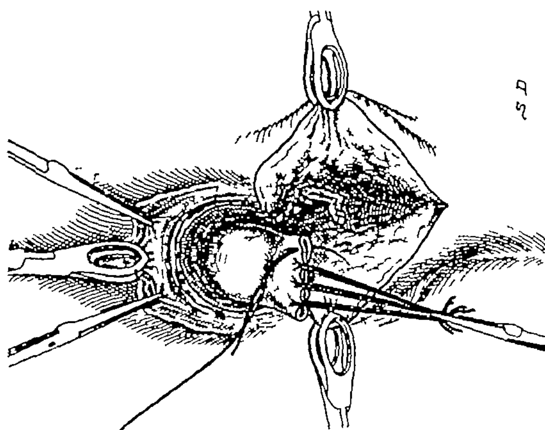


FIG 102.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

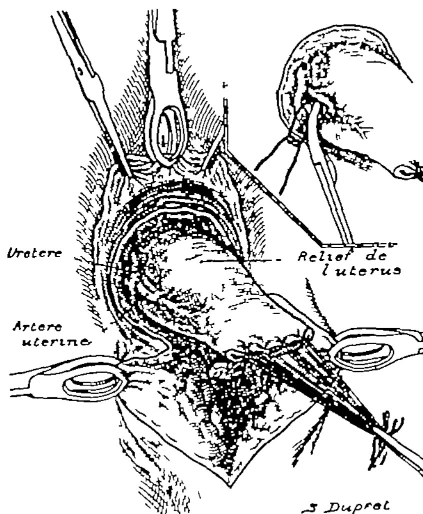


FIG 193.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

Ligature of the uterine artery The ureter is isolated and pulled aside.

Uretère=Ureter *Relief de l'utérus*=Outline of the uterus *Artère utérine*=Uterine artery

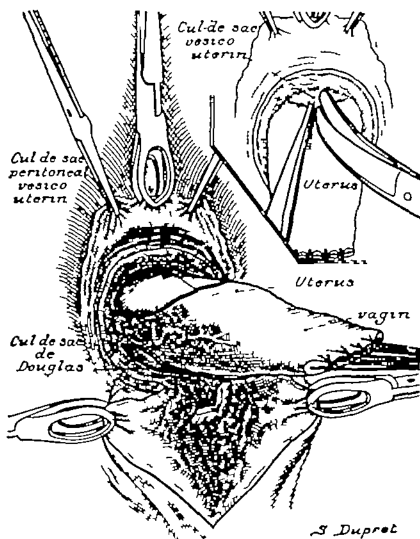


FIG 194.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

Opening of the anterior and posterior culs-de-sac. The uterus falls down.

Cul-de-sac vésico-utérin=Cul-de-sac between the bladder and the uterus *Cul-de-sac péritonéal vésico-utérin*=Peritoneal cul-de-sac between the bladder and the uterus *Utérus*=Uterus *Vagin*=Vagina. *Cul-de-sac de Douglas*=Douglas pouch.

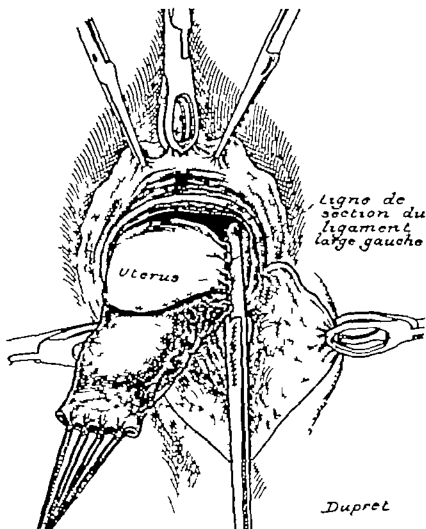


FIG 193.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI

Division of the broad ligament It should preferably be made beyond the adnexa, but if they are difficult to form into a pedicle, as was the case in the patient who served as a model for this operation, the incision should be made between the uterus and the adnexa. Note the rôle of the strong crushing duodenal forceps, which never slip.

Ligne de section du ligament large gauche=Line of division of the left broad ligament *Utérus*=Uterus.

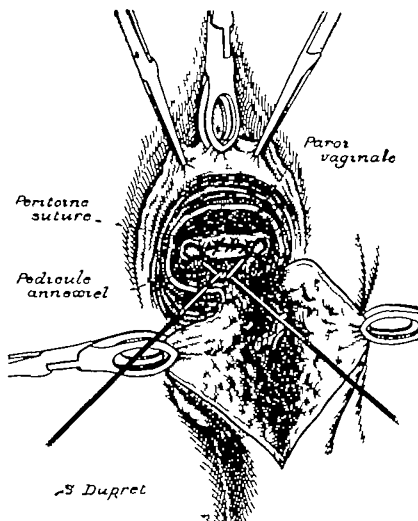


FIG. 198.—ENLARGED VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

The two stumps of the broad ligament should be knotted together outside the peritoneal suture.

Paroi vaginale = Vaginal wall. *Péritoine suturé* = Peritoneum sutured. *Pédicule annexiel* = Pedicle of the adnexa.

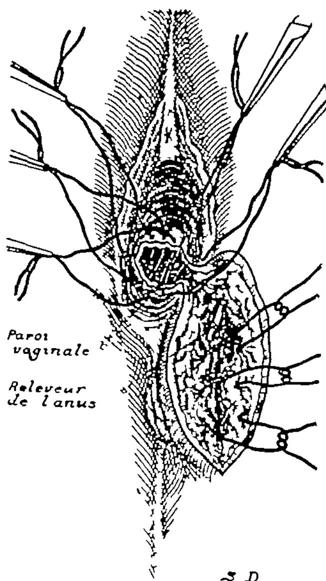


FIG. 199—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

The vagina has been divided at two points: first at the floor (transverse part), then laterally on the left vertical wall. The suture of the floor is not absolutely indispensable. The peritoneal wound ought to be sutured with care. It is to be closed at many levels: one for the levatores ani, another for the fatty tissue, and a third for the skin.

Paroi vaginale = Vaginal wall. *Releveur de l'anus* = Levator ani.

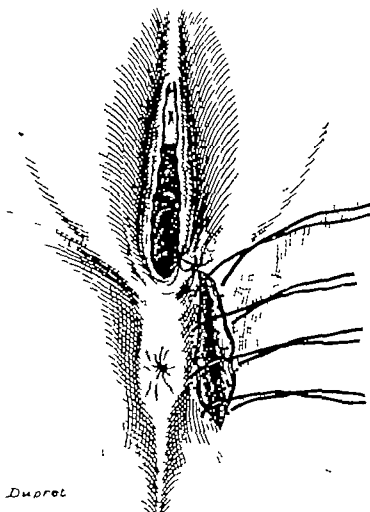


FIG 200.—EXTENSIVE VAGINAL HYSTERECTOMY FOR CANCER OF THE CERVIX UTERI.

Suture of the mucous membrane and of the skin of the vulva and of the perinæum.